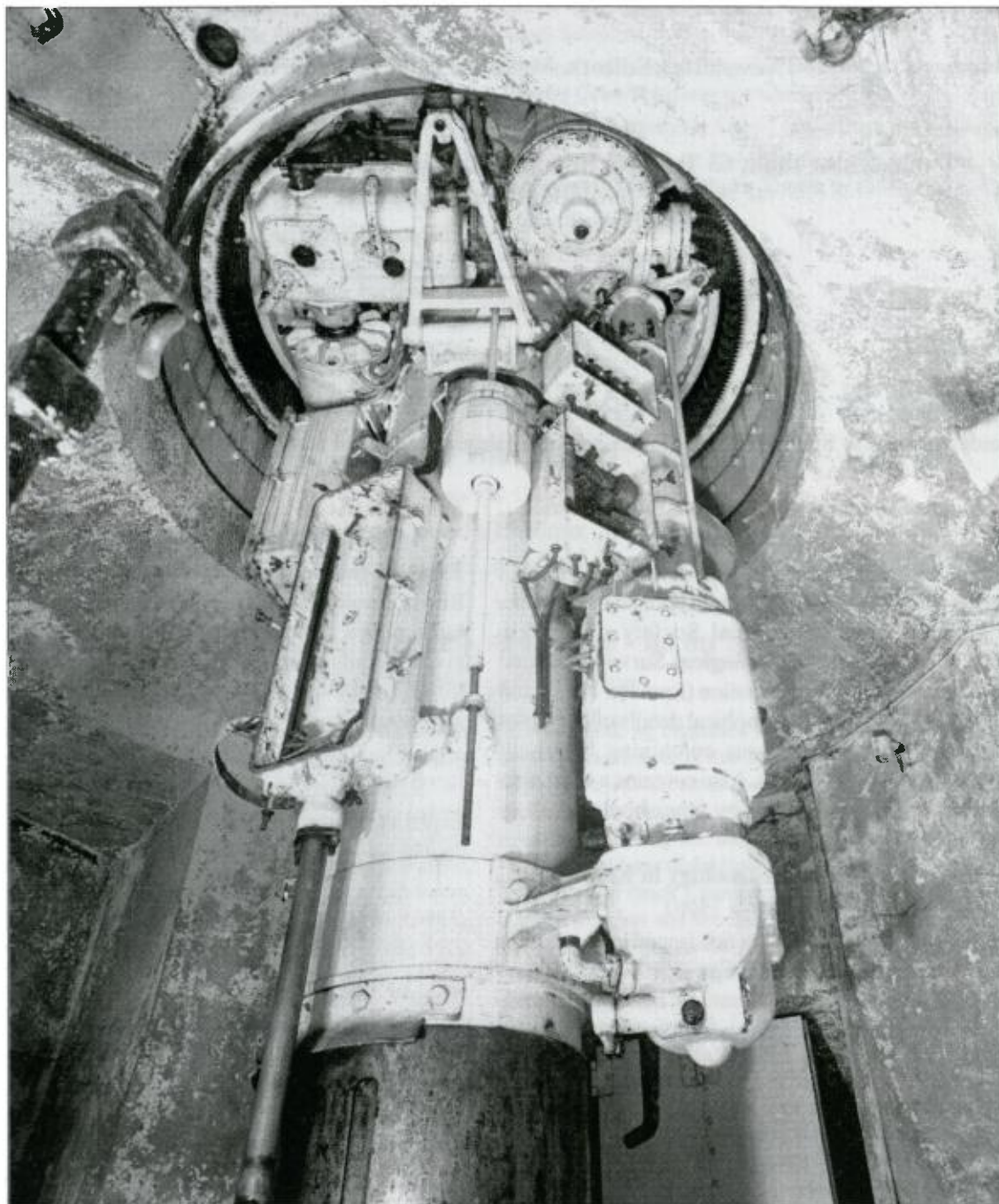


SUBTERRANEA BRITANNICA

SECRETARY'S NEWSLETTER NO 23

2001



Maginot Line - Machine Gun Turret

Subterranea Britannica is a society devoted to the study of man-made and man-used, underground structures and the archaeology of the Cold War. The main focus of interest is on abandoned and forgotten structures and, in the case of Cold War structures, studies are entirely confined to declassified and decommissioned structures.

The society is open to all and its membership includes all walks of life. Members are invited to contribute to this newsletter even if this just means sending very welcome snippets from newspapers and magazines.

Newsletter Editors. Malcolm Tadd and Martin Snow

**Please send contributions to:
Malcolm Tadd, 65 Trindles Road, South Nutfield, Redhill, Surrey, RH1 4JL
e-mail: mtadd@nascr.net**

SUBTERRANEA BRITANNICA GUIDES

Each guide is of one to four A4 sheets. Copies are obtainable on receipt of a suitable size stamped addressed envelope.

1 The geological literature as a source for industrial history

PW Sowan 1999 (single sheet / 2pp)

Explains the status of the three principal publishers of works on UK geology - **the Geological Society of London** (founded 1807), the **British Geological Survey** (founded 1835), and the **Geologists' Association** (founded 1858), and their publications. Gives bibliographical details of examples of the three bodies' publications containing historical information on British industries. Also contains a short note on other such sources published by other bodies such as trade journals.

2 Underground industrial archaeology in Kent -

PW Sowan 1999 (2 sheets 14pp)

Published to supplement the AIA guide issued in connection with the AIA conference in Kent in 1999, provides an overview of mines, underground quarries, a horizontal well, and canal railway and road tunnels in Kent, with a short reading list.

3 Wells in Kent-

PW Sowan 1999 (2 sheets! 3pp)

Explains the published well-catalogue literature of the **British Geological Survey**, and its usefulness as a source of information for existing or former industrial premises, giving details from the Dover catalogue as an example. A list of 10 relevant BGS (of which nine are still in print) is appended.

4 Deneholes and chalkwells -

RF Le Gear 1999 (single sheet! 2pp)

Explains the form, dimensions, history and purpose of chalk deneholes and chalkwells, with two diagrams.

Further titles are in preparation

Available (SAE) from

Paul W. Sowan, Subterranea Britannica, 254 Pampisford Road, SOUTH CROYDON, Surrey CR2 6DD

Newsletters of Subterranea Britannica are published by the committee of Subterranea Britannica. Original articles, book reviews, press cuttings, extracts from books and journals, letters to the editor etc. are welcome. However the editor reserves the right not to publish material without giving a reason.

The committee of Subterranea Britannica and the editor do not necessarily agree with any views expressed and cannot check the accuracy of any material sent in.

Letter to editor

Reading some trade literature recently from French plasterboard and aggregates Company, Lafarge, I came across something that may be of interest to other Sub Brit members.

When sections of their gypsum quarries (some of which are underground) are worked out, they embark upon a restoration process, which involves infilling and restoration to return the sites to their original condition and encourage nature and wildlife to establish itself.

At Portel-des-corbieres, in France they have converted part of the old underground quarry into a storehouse for wines and spirits at a cost of approx. FRF 3 million. The constant 15°C temperature and 80% humidity make the site ideal for this purpose and their considerable size has made them popular as a tourist attraction.

The galleries have been shored up and reinforced in places and some sections have been permanently closed off. The restored sections (totalling 524m in length) have been sold to the local wine co-operative, the Union des Cooperatives des Corbières Maritimes.

This former quarry which is now known, as "Terra Vinea" has become one of the attractions to visit in this popular region. A Gallo-Roman villa and a mining museum have been set up underground and daily tours trace the history of gypsum mining.

Matthew Clark March 2000

Sites and items recently discussed on the net

A large number of e-mails are passed between any members who wish to join in.

It is largely (but not exclusively) chat and mostly used by RSG orientated members.

It would be nice to see more about mines, quarries, grottos etc. included.

Recently the following have been discussed:-

Sub. Control 51E7 at Hillingdon. This was a mid-70s bunker – one of 7 reporting to North West Group War HQ at Beatrice Road, Southhall

Epping Forest District Council Emergency Centre and Malden District Council Emergency Centre.

RSG Turnstile formerly known as Burlington, Corsham.

Friars Bay Newhaven. This was observation post for HAA battery which became Radar Station in 1941

Clifton Rocks Railway.

Berry Hill Icehouse.

For Your Diary

Day Conference at Imperial College London. March 24th

Study Weekend in Peak District July 13th – 15th

Next Sub Brit Trip to France - its on !!

by Linda Bartlett and Martin Dixon

On the back of last year's successful trip (see below), we've volunteered to arrange another trip for 2001. The dates will be Saturday/Sunday 12/13 May - pick up 0800 Saturday at Ashford Railway station and return 7.00pm Sunday. We'll go by coach via Le Tunnel. Probable sites for our next trip include - some lately discovered tunnels in Arras, used in WWII - if we can arrange it; the Atlantic Wall Museum/Batterie TODT near Calais; an underground village in Naours and other underground sites in Picardy. We'll probably stay in Arras again. We're making some contacts in France to finalise the programme - and we'd be really pleased to hear any more ideas of places or contacts. The cost will be round about £100 per person (same as last year) - and will include overnight hotel, meals in France and entrance fees.

To reserve your place(s), please send £20 deposit
BY 20th APRIL 2001 to:

Linda Bartlett/Martin Dixon (SB France)

Heathend Cottage

Windsor Road

Ascot Berks SL5 7LQ

with an SAE, so I can confirm your booking

In May 2000, we organised a visit to northern France - some 35 members and friends of Sub Brit came along. Our first underground experience was of course the Channel Tunnel itself, after a fairly early start for most of us, picked up by coach at Ashford station. A smooth crossing and then on to Vimy ridge where we visited the first world war underground tunnels - a wonderful explanation by a young French Canadian student. Time for wandering the surface trenches and the small museum, and our picnic lunch in the sunshine. The afternoon gave us a chance to visit a new coal mining museum at Lewardes - a coal train and exhibits of working coal faces through the ages. We stayed overnight in Arras, where even dinner was arranged underground - good food and good French wine !! We dined again underground for breakfast on Sunday morning, then a trip to the Boves under Arras - almost every house in Arras had original access to chalk mines used as cellars, and subsequently used in the first world war - an extensive trip guided by Emanuelle! Lunch in a local French restaurant - accompanied by the most tremendous thunderstorm - but it passed for our last visit of the weekend to the enormous blockhouse at Eperlecques, built for the manufacture of liquid oxygen and V2 bomb assembly during WWII. Then it was back home - tired but very satisfied!

My contact - linda.j.bartlett@british-airways.com
or tel. 01344 875424.

Welcome to:

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 R.G. Adams, Brierley Hill, West Midlands
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Hastings Caves

Caves! How the word appeals to the eternal boy in all of us. There is more romance and adventure condensed in those five letters than in any other word in the language. It gives us a sense of thrill in whatever setting it may be placed. The writer of the boys' hook would be severely handicapped in a cave-barred chronicle. The haunter of caves has a dramatic advantage over the dweller in any other kind of habitation. There is a sense of stealth and devilry about him. The caveman, who seems to be the *beau ideal* of the sillier fiction, probably got his curious code of morals from the influence of his dwelling. Why else does he woo his fiancée with a club and thereby prove his superiority to the mere beasts which perish and are content to

I am afraid Sussex cannot claim a dense population of cave men and women, as the county is not well provided with dwellings "for them. The geological formation does not lend itself to the formation of caves, and the cave-man like the hermit crab liked to find his house ready made.

Of the evidences of prehistoric man Sussex can boast more than her fair share. From the Hastings Kitchen-midden has been unearthed a very complete collection of relics, and the Piltdown skull is one of the three or four most famous links in man's ancestry that the world has yet disclosed. The St. Clement's Caves, stretching for some acres under the bill on which Hastings Castle was built, though north of the castle itself, are of natural formation considerably aided by man's handiwork. The stroke-mark of the pick is as plainly manifest in some places as is that of the tide in others, where the ripple marks which we see on the sands at low tide are clearly to be seen in some parts where the roof was low enough not to need heightening artificially.

The caves were probably a series of hollows which have been opened into each other so as to give a continuous chain of vaulted chambers. They were quite possibly inhabited by prehistoric man, but no evidence of such habitation remains, as the caves have been used as a quarry for silver sand, and any prehistoric remains which might have been left have been removed. It is a great pity that they were not capable of preserving the evidence of their early tenants, as the caves in limestone districts, under a flooring of solid lime from the drip in the roof.

The story told by the guides that the caves were first discovered by a gardener of the Rev. Mr. Scott when digging the foundation for a greenhouse in 1825 is not much more accurate than the premature report of the decease of Mark Twain, which, he explained to the paper that published it, was considerably exaggerated. There exist prints of a much earlier date showing the entrance to the caves in the side of the hill, then called the Coney Banks. During the Napoleonic Wars, at the beginning of the last century, the Duke of Wellington was in command of the garrison at Hastings - though at that time he was only Sir Arthur Wellesley. Once more did caves act up to their evil reputation, and Sir Arthur Wellesley and the military authorities had to have the entrance of the caves blocked up in defence of the morals of the recruits.

The original site of the entry can be seen on the right as the visitor leaves the long sloping passage from the entrance wall to the main caves cut by Mr. Scott's gardener, who had obtained the right of selling the sand he quarried. This excavation and the cutting of the entrance hall was done between 1825 and 1836. The place where the gardener's spade came through is the only place where daylight penetrates. It is a narrow chink of light, but it is dazzling when one's eyes have got used to the Dom Daniel murkiness of the cave.

When we were small children, more years ago than I care to think about, we used to organise hide-and-seek parties in the caves, as at that time they were lit up every Thursday with a candle here and there stuck in an iron sconce on the wall, not, as is shown in the photograph, on the sand of the floor. The lights were few and far between, and I am afraid we used to be a sore trial to the official guides, as the easiest way of escaping the 'He' was to throw a handful of sand at the nearest candle till the 'He' had blundered by it in the dark. The guides used to impress upon visitors that it was dangerous to go unaccompanied by them, as they might well get lost, but we never did.

Just at the end of the entrance passage and over the arch that leads to the caves proper, there is a colossal figure engraved in the sandstone. This was cut by Mr Scott's gardener, and is said to represent the reverend himself, but it has a military appearance and maybe he meant to be an effigy of the Duke of Wellington. When the caves were re-opened in 1825 there were found two carvings in the walls, one an episcopal looking figure in bas-relief which is called by the guides an early Christian saint. One may take *cum grano salis* the statement that the caves were used by the early Christians of Sussex to escape persecution, the analogy of the catacombs of Rome probably suggesting the idea. The chief argument brought forward in its favour, the figure of the 'saint', is dressed in suspiciously modern episcopal robes with full sleeves gathered in at the wrists. The figure is now behind a grille of wire netting, as some vandal has, to use the words of the showman in Huckleberry Finn, defaced it about 'by cutting away the forehead to give the appearance of horns. It is a curious trait, this mania for mutilating ancient monuments, though understandable if the result of perverted religious zeal, but this disfigurement would appear to be somebody's idea of a joke. Let us charitably hope the jester had the excuse of being mentally deficient.

The other carving is that of a sepulchral urn. The sand underneath has been scraped away down to the native rock and no indication of a grave has been found, so the memorial may be taken as a cenotaph, if indeed it is a sepulchral symbol.

There is a curious feature in one of the caverns which has now lost much of its significance. It is, for want of a better name, called the font, and it is suggested that it may have been used for baptism by total immersion. It is roughly circular in shape and two-thirds of the circumference are formed by the cave walls, and the other third being a wall of the natural sandstone about three feet high from the outside, which has now been worn away in one place by generations of visitors climbing into the font. Another possibility was that its purpose was to store water as there is no sign of a well in the cave and the font, if puddled with clay like a dew-pond could have been used as a reservoir. When I was a small boy the wall was almost intact, and I am afraid I may have done my sharing of wearing it away, as the font was sacrilegiously used by the hide-and-seekers as 'home'!

The caves have by some been given an entirely commercial origin, as being only a quarry for silver-sand for glass makers who, with the iron workers, were responsible for burning up most of the forests of the Weald of Sussex. This view seems hardly tenable when we see the ripple marks on the cave roof, and with the whole formation of the hills available for quarrying, why should the men go to the expense of mining the sand? though perhaps the surface sand was more charged with iron, which may have been injurious to the glass metal in the pots. But whatever the origin of the caves may be, they are well worth a visit, and there can be no harm in believing anything about them where there is so little evidence as to their early history.

Chelsea Speleological Society

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Williamson's Tunnels, Liverpool

There are two society's which deal with the preservation of Williamson's Tunnels in Liverpool but there seems to be no liaison between them. The first, Friends of Williamson's Tunnels, is well known to us and members of Sub. Brit. enjoyed a memorable Study Weekend organised with them in 1999.

The second society is The Joseph Williamson Society which has now obtained considerable funding for restoring part of the tunnels and building an information centre all for the benefit of tourists and local people alike.

A number of tunnels were excavated under the Edge Hill district of Liverpool by local eccentric and philanthropist Joseph Williamson during the 1820s and 1830s but were eventually sealed up and forgotten. More recently a scheme to build student

accommodation on a site in the Smithdown Lane and Mason Street area brought into public discussion the fate of the tunnel beneath. Thanks to enthusiastic campaigning by the Joseph Williamson Society, the generosity and foresight of the developer and public funding, the preservation and restoration of that part of the tunnel complex at Mason Street is now ensured.

The Joseph Williamson's Society annual subscription is £5 and information can be obtained from: Simon Wrigley, Liverpool Architecture and Design Trust, 16 Vernon Street, Liverpool L2 2AY. (Simon Wrigley has contacted Sub. Brit. in the past.)

Information for this article was taken from, Follies, Volume 12, No 1, Summer 2000 and a feature article in The Guardian.

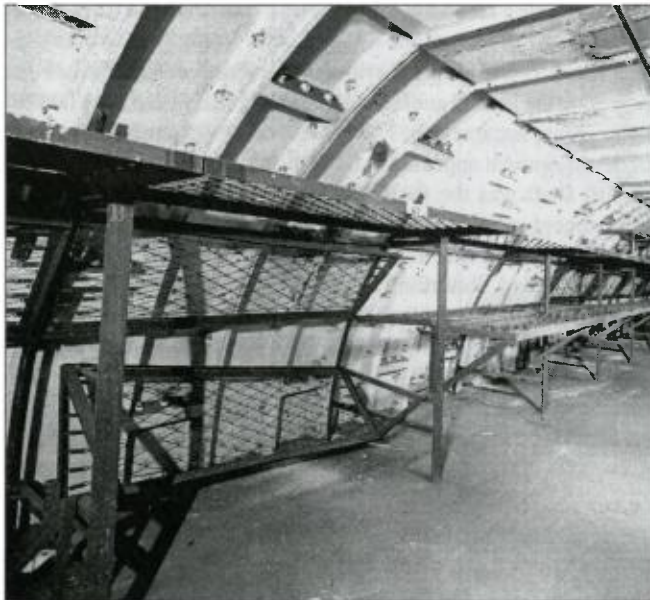
Visit to Belsize Park deep level shelter 27th January 2000

Three members of Subterranea Britannica visited the deep level shelter at Belsize Park on 27th January 2000. We entered through the southern entrance on the corner of Haverstock Hill and Downside Crescent but the photographic survey began at the other end so that is where I will start this description.

The northern entrance is behind 210 Haverstock Hill, NW3 and is used as the company car park and emergency access to the tunnels. From inside it was obvious one of the original entrances had been bricked up with two steps leading to a sliding metal grille and then a brick wall with a small window in the top. The circular turret has the lift shaft running down the centre which also acts as the ventilation intake shaft through a raised block with ventilation louvres on the roof of the turret. A circular corridor runs around the lift shaft with two stairways winding around it, one leading to the upper landing and the other to the lower landing 140 feet below. The stairs to the lower landing are accessed through a trap door on the floor. The lift is in working order and the stairs to the upper landing are lit, the other stairway being unused.

At the bottom of the lift shaft there was no lighting as the wiring in this part of the tunnels is considered unsafe. Turning right leads first to the extract fan and then into the switchgear room. At the back of the room is another small room containing the transformer for powering the lift and beside it a metal cabinet containing a large mercury arc rectifier. This consists of a very large 'valve' standing about 15 inches high and shaped like a large electric light bulb. At the base are a number of horizontal glass projections or legs which give this device the name 'the octopus'. Both the transformer and the rectifier date from the 1940's and are working. The rectifier was giving off a vivid purple glow with electric arcs jumping about inside. We stayed there for many minutes watching the light show before closing the door to continue the photography. Along one wall was a bank of fuse boxes and switches and along the other wall two long floor standing cabinets with glass front panels containing rheostats for controlling the speed of the lift. These two cabinets, which also date from the 1940's were no longer in use.

Between the switchgear room and the extract fan was a large grating in the floor and we could see a ladder leading down into



Belsize Park Deep Level Shelter - WW2 beds



Belsize Park Deep Shelter - WW2 bunks on the left hand side and storage shelves made from old bed frames on the right hand side

what was obviously the sump. We removed the grating and climbed 15 feet down the ladder at the bottom of this was a short passage leading to the bottom of the exhaust ventilation shaft. There was a very rusty trap door in the floor which we didn't try walking on as there was water below it. Another tunnel led to a small chamber containing pumps, partly submerged and a large tank which may have been for sewage. Above our heads at the bottom of the exhaust shaft was another small fan with a ladder to a landing above it. We climbed 15 feet up rusty ladders to a very rusty and rotten landing which was at the back of the extract fan. Above was some winding gear of unknown use and then the shaft was clear to the surface where a chink of light could be seen.

Returning to the lift shaft we went in the opposite direction where the tunnel turned through 90 degrees with two rooms on the right hand side with a wall in front of the doorways. These were the ladies and gents toilets - no original fittings remain. After the toilets this tunnel joined the upper deck of the first 'shelter tunnel' at right angles approximately one quarter way along the length. To the right (north) the tunnel was empty apart from rubbish and some racks left by the previous occupier. At the end was a stairway down to the lower level. Straight across the shelter tunnel another short tunnel linked to the upper floor of the second 'shelter tunnel' and straight across from that another short tunnel that had contained the medical post.

Turning left (south) along the first tunnel the right hand wall was lined with original metal framed beds along its entire length, one above the other. The bottom bunk was a double folding bunk while the upper bunk in the curve of the roof was single and fixed in position. Along the left hand wall were what at first glance appeared to be two lines of bunks one along the wall and one free standing a few feet into the passage. On closer inspection these appeared to be shelving constructed by a previous occupier from the original metal bed frames. A few yards along the tunnel on the left hand side was a stairway down to the lower level. Apart from the beds, this section of the tunnel is unused and unlit.

About half way along the full length of the shelter tunnel is another cross passage with a wide stairway leading down to the lower level and up about 20 feet round a right angle bend to a brick wall - this was the connection through to Belsize Park Station. There appears to have been a small fire in this area at some time.

Returning to the shelter tunnel, from this point the tunnels are lit and used. The original bunks are all in use along one wall and the adapted bunks in use along the other wall. They are stacked with boxes of documents. At a point three quarters along the tunnel there is another cross passage with a small room on the left hand side that has been used as a workshop. We did not examine the last quarter of the tunnel ahead of us but turned right across the second 'shelter tunnel' past two more ladies and gents toilets to a door on a right angle bend in the tunnel. Straight on led to a second switchgear room with another extract fan, another grating in the floor, another transformer, another glowing mercury arc rectifier and another pair of rheostats. To the right led to the bottom of the lift shaft and stairway to the surface.

At the top of the shaft was the lift room with the original control

box (with a modern one inside it) and the motor, part of which was original. As well as the circular corridor around the lift shaft there are a number of other rooms now used as offices, store, kitchen etc.

Throughout the tunnels the only original signs on the walls point to the exits and all the tunnel linings are embossed LPTB (London Passenger Transport Board). You could feel and hear passing trains going by at regular intervals.

By now we had spent five hours photographing the tunnels and there was no time to visit the lower level or the Camden Town shelter. These will have to wait for another day.

Those taking part in the visit were Nick Catford, Dan McKenzie, Richard Challis and Alan Lawrence.

Nick Catford

Follow up: Visit to Belsize Park deep level shelter

Following my photographic visit to the Belsize Park deep level shelter on the 27th January I arranged a 2nd photographic visit, this time to the Camden Town shelter. There are two entrances, one in Buck Street, N.W.1. adjoining the covered market (this is now only used as an emergency exit), and the other in Underhill Street, N.W.1, behind the Marks and Spencer car park.

Just inside the main entrance there are a number of small rooms now used as an office by the archive company who rent the shelter. A few yards inside the door is the top of the lift shaft with twin spiral staircases around it, one to each of the lower levels. There is a map on the wall titled 'Camden Town deep shelter' showing the layout. Adjacent to the lift shaft a door leads into a small room housing the transformer for powering the lift, (manufactured by Hackbridge of Walton on Thames) and a metal cabinet that had originally contained a mercury arc rectifier. According to one of the staff the rectifier has now been removed, the room was full of junk so we couldn't get across to it. We descended to the upper landing, approximately 50 feet below the level of the northern line. The lift opened into a well lit curving passage. Immediately there was a door on the right which opened into a long room containing the fan which was of a different design to that at Belsize Park. Beyond the fan was a rusty and rotten grill in the floor leading to the sump. The ladder was still in place but having descended into the sump at Belsize Park we decided not to on this occasion. Beyond the sump, another door led into a switch room with a lot of electrical boxes on one wall and two floor standing cabinets containing rheostats for controlling the speed of the fan. None of this equipment appeared to be operational. There was a large schematic diagram of the switch gear on the back of the door labelled 'Home Office deep shelter'

We returned to the main passage which soon straightened out. On our right were a male and female toilet block, each with a wall in front of the open entrance for privacy. Both rooms have been stripped of all fittings and contain dexion shelving and are used for storage. Evidence of the positions of WC's, urinals and sinks were visible. Beyond the toilets is a crossroads where the entrance tunnel meets the main shelter tunnel approximately one quarter along its length. Unlike Belsize Park where the two shelter tunnels are fairly close together, at Camden they are separated by about 150 feet. We moved on to the second shelter tunnel at a second crossroads. There is a long room straight ahead which originally housed a medical post. We turned left along the main two level tunnel which is lined along both sides with shelving containing cardboard boxes. Some of the shelving is modern dexion while other shelving is made from original bed frames. Approximately half way along the tunnel a wide stairway leads down to a lower cross passage and the lower deck. A few yards along the cross

passage a door leads to steps up 50 feet, originally connecting to the northern line platforms at Camden Town Station. There is some shelving along one side of the stairs but nothing is stored there yet. Climbing the stairs the atmosphere becomes very humid with the temperature steadily climbing. At the top of the stairs are some original air filtration units and a sliding metal grill giving access to the northern line platforms. They way through has been bricked up. Returning to the upper landing, a second narrow stairway again leads down to the lower landing with a second parallel cross passage containing two toilet blocks. Back on the upper level the next section of passage contains all its original bunks on both sides, as yet not used for storage. On the right hand side there is a single bunk almost at floor level, a twin bunk above it, one half hinged, and another single bunk above that. On the opposite side the bunks are at right angles to the main passage which is divided into bays. Each bay contains six bunks, two stacks of three singles. There are two original signs lying on the floor in this area. One has an arrow pointing to 'Underhill Street entrance' and the other has an arrow pointing to 'Buck Street entrance'.

About three quarters of the way along the tunnel is another cross roads, left to the parallel bore and right to another male/female toilet block followed by a door on the left to the Buck Street lift and a door straight ahead leading to another fan and another switch room, similar in design to the Underhill Street end. There is a Ministry of Works notice on the wall stating that any staff caught smoking will be dismissed. The lift is operational with twin spiral staircase going around it. We went up in the lift to the Buck Street entrance. At the top of the lift is another Ministry of Works sign and room containing an original Hackbridge transformer for powering the lift and another metal cabinet that would have housed the mercury arc rectifier. The cabinet door was jammed but none of the equipment appeared to be working. Round the other side of the lift shaft was the motor room. The motor appeared to be a more recent addition. Steps lead up to a winding passage leading to the emergency exit. This passage is rubbish strewn and appears to be little used. Returning to the main tunnel, we are now in the final quarter of the shelter. At the far end, there is a door in the end wall with a final cross passage to the parallel tunnel and a steps down to the lower landing at each end.

Most of the tunnels and cross passages, toilet areas, medical room, wardens post etc. are in use for document/computer tape and video tape storage. Unfortunately, because of the use that the shelter is now put to we had to limit the party to three (Nick Catford, Dan McKenzie & Tony Page). As at Belsize Park, we were given a free hand to go anywhere and photograph anything and spent around three hours in the shelter.

Nick Catford 30th March 2000

Llanberis trip report

Servicemen were working at Llanberis through much of the Cold War, clearing weapons that were abandoned there. Our visit was on a warm sunny day. The obvious part of the site resembles eight parallel railway tunnels opening out into a vast concrete tank about 100 metres by 60, with walls 12 metres high. The area was a cut-and-cover construction, formed in the bed of a large slate quarry. There were two levels, and the site was very compact, albeit large. A similar construction was used at Harpur Hill — but never again. The ceiling of the lower levels forms the floor of the upper levels, which have an arched roof, covered with 8 metres depth of slate waste. One of the galleries is wider and slightly higher than the others, and has a single track railway line running into it the full length, with a wide platform on the North West side and a narrow one the other. An entire train of railway wagons could be brought in for loading and unloading. Such a train, of 27 wagons according to McCamley, was inside of 25 January 1942 when the roof of half the space collapsed, burying the wagons and blocking the only goods exits but not exploding. At the time, 14,000 tons of munitions were stored there, all suddenly inaccessible. Over the next nine months most of the bombs were recovered through the back entrance, which was an adit to another slate quarry. This was a seventy foot deep pit, and the bombs had to be lifted out of the pit. An inspection at Harpur Hill showed signs of weakness, and much of the overburden was hastily removed. Since the level of the overburden at Llanberis today is not level with the top of the quarry pit, this may also have been done at Llanberis over the uncollapsed part.'

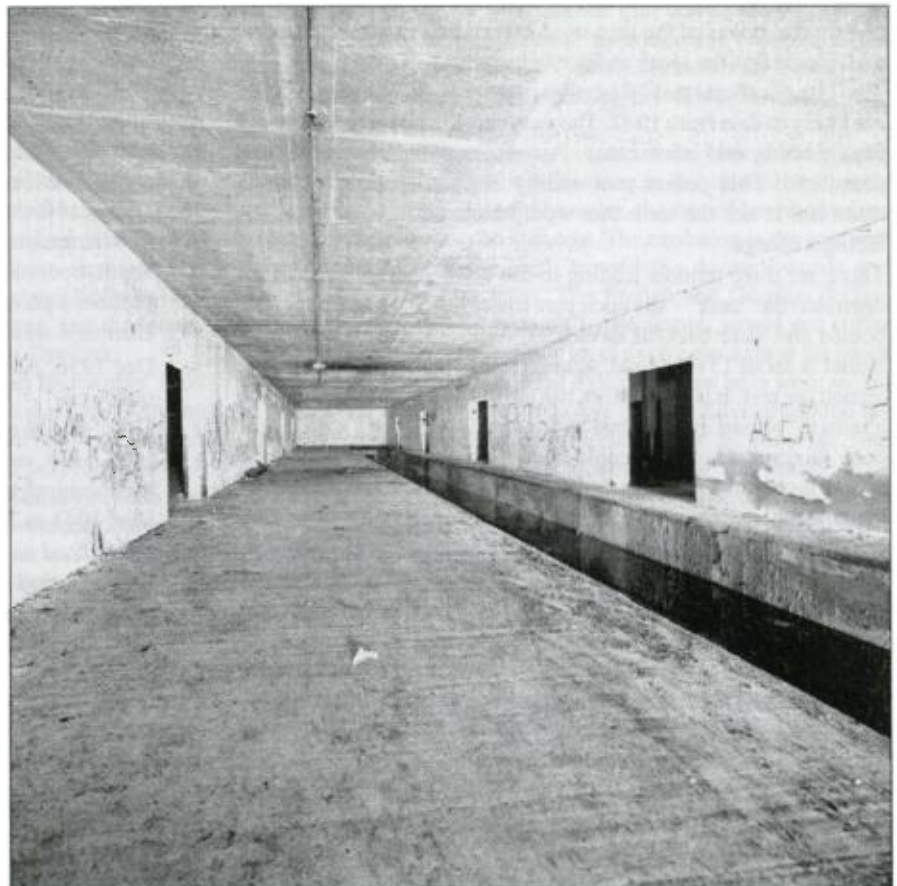
Inside, the remaining galleries are very dry, clean and in good condition, with limited graffiti and no vandalism and not much litter. The walls in the covered part are all painted white, and there is evidence that this is original paint from 1941 (since none of the brickwork is painted). The lower level is about 15 feet from floor to ceiling, with walls running the full length separating the galleries. Each gallery is about 24 feet wide and over two hundred feet long, ending in a thick brick wall which was built to separate the uncollapsed part from the area where the collapse occurred. The wider gallery is between gallery B and gallery C, and is not itself lettered. Except in this wider gallery with the railway line, concrete pillars about 12 feet apart run down the centre, supporting a concrete beam running the length of each gallery. These help to support the ceiling, which forms the floor of the level above. They are apparently original, because each corner has a steel rubbing piece built in, as do the other openings but not the brick reinforcements seen in some places, which I believe to have been installed as strengthening after the collapse. The side walls have square openings about 15 feet wide every so often, some of them bricked up. The galleries are lettered A to H on the lower level and J to S on the upper level. Each gallery was numbered into eleven bays. The bay numbers can be clearly seen on the walls, but there is no divider between the bays except a red roundel painted high on the wall midway between the numbers.

The numbers run from 6 to 11 on upper and lower levels, leaving bays 1 to 5 in the open area where the collapse occurred. Roughly half of the total underground area is thus now open to the air (the "tank") and half still covered.

There are two galleries to the right of the railway line, A and B downstairs and J and K upstairs. The furthest right is J gallery upstairs. A / J is much shorter than the other galleries. It has only bays labelled J8, 9 and 10. At the back, part of the floor is higher, and this is a blind gallery, running forward only as far as J8. The others all run from 11 to 6 before ending in the brick wall, but for gallery J there is no brick wall and no external sign at all. J10 is also not full width. My guess is that the original quarry was slightly wider here, and the builders took advantage of the extra space. Gallery M has two lifts. One is at C6 / M6, hard up against the brick wall and barely any use. Surprisingly, no effort appears to have been made to open the other side of the lift so that it could have been used more readily. The other lift is at C9 / M9. The wiring is very old, gutta percha insulation and no sign of post-war modernisation.

The upper level galleries are the same width as the lower, but they have an arched roof and there is no line of central pillars as in the lower galleries. The doorways between the galleries are smaller than below, and arched rather than square. Several have been reinforced after the original build with 4 courses of brick, also formed into a beautiful arch, but without the steel corners seen on the original concrete construction. This brickwork narrows the opening from 12 foot to six foot wide, and drops the height of the arch from 11 to 7 foot. Around M, N and P*several of the archways are completely bricked up. There is a single staircase between lower and upper levels, at C11.

There are some few electrical fittings left. Main power came in



Llanberis Bomb Store - the area that collapsed



Llanberis Bomb Store - railway platform

through the back tunnel. Most of galleries show signs of tubular conduit for hanging lights, and a few of the reflectors remain. All of the switches have gone, except the casing of one which shows clearly that it was of the type used in furls and explosives stores, which contains the spark inside the housing.

Two bits of official graffiti have been painted on neatly, and again are likely to date from 1942. They say that the practice of spitting is disgusting and must cease. Anyone caught spitting will be dismissed. This points to a mainly civilian workforce, since dismissal is not the term that would be used for a serviceman facing a charge.

There are three tunnels leading to the main storage space. Two open into the "tank" - the open part where the collapsed concrete, bombs and slate backfill have been removed. The main access tunnel is about 15 feet wide, square section part of the way and is arched the rest. It is quite short, has a bend and is large enough for a railway wagon. It ends now at a palisade fence and gate. It has been shotcreted, and this could have been done at the same time as the work on Dinorwig power station (which has extensive shotcreting) or may be much more recent, according to one eyewitness account.

The second tunnel is smaller and is now a dead end, and is not shotcreted. You can enter from the storage area, but after a bend to the right the tunnel is blocked to the ceiling with a jumble of waste stone. After the bend the tunnel is concrete lined and arched, with signs of decay in the concrete. Reinforcing rods could be seen, about 3cm thick and 12 cm apart.

The third tunnel is at the back of the storage area in gallery D, and is mostly unfinished rock. It is about 7 feet high. The floor is very rough concrete, but there are rotten wooden sleepers set into the concrete. An open water channel runs on one side, with water running into the workings to the start of the tunnel, where it drops into an inspection pit and is carried away in a large earthenware

pipe about a foot in diameter. It is the noise of this falling water that you hear throughout the upper galleries, sounding at first as if fans were running. At the bend of the tunnel, the straight passage is bricked off, while the open tunnel bends to the left and goes into the open air past a vertical shaft up which power cables ran. My guess is that this was an old adit, adapted for power supply and emergency exit and then adapted again for the painstaking removal of the munitions after the collapse. Significantly, the floor of this tunnel is not level with the floor of the storage galleries, being about a foot higher. This would have added to the handling problems getting the munitions out in the recovery operation.

The back pit is about seventy feet deep, and maybe 100 feet square. Off to the right is another adit, leading slightly downwards and filled with water, with no sign of exit. Back outside in the "tank", there is little to see. The space between the railway platforms has been filled recently with rubble, and floor was clear but has had several loads of spoil tipped there. Our guide had said that on his last visit the floor was completely clear, no stone larger than a fist anywhere. On the walls are the remains of wooden signboards every few

feet, which would have been bay labels (unlike the ones inside, which are painted). This lends support to Nick McCamley's comment that the cleared open area was used from 1943 for storage of incendiaries.

After the war there was long term activity at Llanberis, in the form of a small RAF detachment of bomb disposal people, patiently clearing dumped weapons. The story goes that large quantities of incendiaries were dumped at the end of the war into the water filled pit to one side of the main storage area. Once the existence of this hoard became known, it all had to be cleared.

Various notes I found in my database record the following snippets:

- 31 Maintenance Unit RAF Llanberis was the 4th underground depot, operational by end of 1940
- Llanberis parented Rhiwlas, Holywell
- Llanberis was RAF bomb store, cleared in 70/80s
- Dec 1956, put into Care & Maintenance, RAF Harpur Hill took over
- 1942, £0.5M spent improving underground
- 1953-1958, explosives site MU or sub-site available 1953 for chemical weapons storage, expected to close by 1958
- May 1941 to 1956, 70 acres
- 1956, used as accommodation for Dinorwig underground power station — this must refer to domestic accommodation or using the site for cabins
- 1969 to 1975, explosive clearance from Glyn Rhonwy slate quarry

I am trying to get more information from private RAF sources, and what I get I'll post. Thanks to our guides.

Now who knows what's at Rhiwlas - "a permanent surface High Explosives store"? Does this sound like a weekend trip? Olwyn Goch / Milwr tunnel, Rhiwlas, and the RAF radar sites on Anglesey at Ty Croes, Rhosneigr, South Stack, Wylfa?

By Bob Hankinson bob.hankinson@bigfoot.com

The Maginot Line trip

Fourteen Subterranea Britannica members made the trip in June 2000, ably organized by Dan McKenzie, who also did most of the driving. The happy band of underground folk were: Dan McKenzie, Richard Challis, Bob Hankinson, Nick Catford, John Burgess, Cris Subrizi, David Ferris, Paul Sowan, Stewart Wild, Tony Page, Keith Ward, Roger Cleaver, Mike Clarkson, Pete Walker.

Via Peterborough, Swanley, Dover and Calais we reached Maastricht and had a lot of fun trying to get the minibus to the hotel due to roadworks. There we met Joep Orbons, a Sub Brit member who lives in Maastricht. He led us to **Fort St Pieter**, a Napoleonic fort which guarded the Western approach to Maastricht against the French. Roughly shaped like a bishops hat, the gallery had firing slits covering the ditch - though the angle of view from each slit was very small and fire would have to be random when attackers were in the ditch, rather than aimed. Below the fort was a limestone quarry, also partly defended, but dating in part possibly from Roman times. This was our one view of quarrying on the trip.

Saturday started with a visit to the disused **Joint Operations Centre at Kanne**, used as the Alternate War HQ for 2nd Allied Tactical Air Force until about 1990. Built in a disused stone quarry, it had a permanent staff of about 20 and a wartime establishment of about 200. Bob Hankinson worked there February and October on exercises for three years in the early 80s, and was delighted to pick out his office from a declassified floor plan which Joep Orbons provided. Since he was on day shift, 12 x 7, he would see no daylight for a month, since it was dark on going in and dark on coming out. He recalled exploring with the firemen, going out of the emergency exit into the farmer's quarry and seeing wall carvings, and going in the Netherlands and coming out in Belgium. Badly contaminated with asbestos, there was no possibility of going in - the last visitors were obliged to wear white suits and respirators. NATO still have the lease, but are not looking forward to its ending, since the owner wants it back without asbestos.

Fort Eben Emael [www.fort-emael.be] a couple of miles away, is a very important historic fortification of the 20th century. It was built between 1932 and 1935 and consists of 17 bunkers, joined by underground galleries, with barracks, power generation, etc. It lies about 30 km from Germany, right on the border with the Netherlands and on the edge of the Albert Canal that skirts Maastricht just inside Belgian territory. Its role was to dominate three bridges over this canal, and the surrounding area, and to provide time for ground forces to react to an invasion. Its importance lies in three facts; the first use of glider borne assault troops, the first use of shaped explosive charges, and the breach of the defensive strategy that led so quickly to Dunkirk.

It was manned during the phony war between September 1939 and May 1940, when Britain and France were at war with Germany but Belgium and the Netherlands were not and the strict Belgian neutrality held the British and French forces at the French border. The authorised garrison of the fort was 1200 men, but only 800 were on the strength when German troop movements started on the border at 00:30 on 10 May 1940, before war was declared on Belgium. Eben Emael was alerted at 00:32. Being 30 km from the border, and having suffered many alerts before, there was no immediate sense of attack, and the gun bores were still thick with grease. Men came in from the nearby barracks, but the pre-arranged alert signal of 30 rounds of blank fired at halfminute intervals had still not been fired three hours later, by 03:30. Jottrand, the commander heard artillery fire from Maastricht at 03:07. He was working through his readiness plan assuming that German forces still had to cross the border 30 km away, and diverted some of the men who had just reached the turrets to come back to the entrance to empty and demolish the external wooden barracks. As this was developing, at 04:15, gliders were reported a few km away, though not recognised as gliders, nor were German

markings large enough to be seen in the dawn light. They realised at 04:25 that they were manoeuvring to land on the plateau above the fort, and many of the self defence works were unmanned. Just 77 German troops landed on the plateau that forms the roof of the fort, and attacked the cupolas that provided roof defence, some of which were not even manned.

The sudden attack, the confusion generated by undeclared war and silent arrival of the unmarked gliders, and the unexpected success of the shaped charges demoralized the fort's garrison. Within 36 hours, now surrounded by German ground forces in strength, they surrendered, unbeaten but unable to continue their role. Loss of the fort can be ascribed to lack of barbed wire, not foreseeing airborne attack, not manning the roof defence positions, surprise attack before declaration of war, and the use of shaped charges. The effect of the loss was a great blow to Belgian and Allied confidence, because Eben Emael was reputedly the strongest fortress in the world. If it had held for 6 days, the minimum expected by the French whose ground forces were poised to wheel north from the Maginot line, the rout and dash for the coast might have been turned.

The shaped charges seemed very effective against the steel cupolas, but did not have an appreciably greater effect on concrete. One graphic effect of an explosion in a confined space - where we took a group photo - was seen at the foot of the stairs to "Maastricht 1" Casemate. The Germans gained entry as far as the pair of armoured doors at the foot of the stairs and exploded a charge. It blasted one of the inner doors off its hinges, and the blast rebounded off the facing wall and badly damaged the other door. The blast wave travelled through much of the fort, knocking people flat and breaching barrels of chloride of lime disinfectant, which caused chlorine fumes to spread. It also destroyed the stairs, which stopped the Germans from gaining entry! Air from outside could be filtered, though banks of cylindrical filters set in the floor of the two central filter rooms that served the whole fort. The considerable trouble caused by smoke and chlorine fumes came from inside, not outside. The air system in the blocks was able to clear fumes, but there was no provision for clearing the tunnels.

For the technical: The floating hinges on the blast doors were a clever refinement - allowing the door to be pressed uniformly into the frame when closed. However, the use of bevelled edges to get a better seal was a poor design. The explosion in the confined space at the foot of the shaft bowed the doors inwards and disengaged the locking bolts. The French and German design, using a flat door which butts up to the frame, would not suffer from this weakness. The fighting blocks were gas tight at the block level, whereas the Maginot Line blocks we saw later were sealed at tunnel level. Eben Emael also had metal staircases around the lift shafts, while the Maginot staircases were all concrete. One refinement: the main staircase between lower and middle level had 150 steps, which were higher at the bottom than the top, to allow for tiredness if you were running up them!

Tunnels were concrete lined and plastered. By contrast, the Maginot Line tunnels we visited later were lined in stone blocks, then cement rendered. After the tour, we explored above the fort, a pleasant walk in the sun. The vegetation has grown considerably since the war, and it is sometimes difficult to see how it must have been. The attack on Eben Emael did not demonstrate that fortresses were impractical. The smaller fort of Aubin Neufchateau, attacked in a conventional way by a division of German troops, held out for 14 days, at a cost of 6 Belgians killed and 2000 Germans killed and wounded.

Next day, we visited the Maginot Line fort at **Immerhof** [www.geocities.com/Athens/9173/index.htm] This is in excellent condition and a first rate explanation was given by our guide, Patrice Lang. There are 5 blocks:

entrance block, barracks, two machine gun blocks for self defence and mortar block. The blocks were joined by a tunnel about 100 metres long, branching in a Y at the end. With a garrison of 200 men, the only offensive armament was the 81mm mortar. The purpose was to fill in the line between larger forts. It was used by NATO after the war, probably as a remote radio site. The fixings for the camouflage netting were unusually strong, and our guide told us how one of the French garrison had ridden his motorcycle down the steel netting. At other sites the netting hooks were just bits of reinforcing rods sticking up in a loop.

On to the major fort at **Hackenberg**. This is one of the largest forts, and is open to the public. The narrow gauge electric railway is used to take visitors into the fort. It is 1.5 km from the front entrance to the furthest point - but the visit only takes you about halfway. Here we saw the overhead gantry rails, which were used to transfer stillages of ammunition from the magazine to the rail cars, and then from rail cars at each block onto the lift and up to the fighting block. This was our first sight of the larger fighting turrets, which held 75 and 135mm guns, able to dominate the local countryside if the observation cupolas could give accurate spotting. The ground outside was pre-surveyed, and fire orders were given by the Command Post to the guns. The gunners in the turrets could see nothing, much as in a ship. The comparison with a ship was repeated in many ways. The fire orders were given by repeater telegraphs, just as the orders from bridge to engine room were given in ships. Each fire order would have taken a minute or two to transmit, since the codes had to be given for type of shell, bearing, elevation, etc.

The lifts had the overhead gantry rails, so that three stillages of ammunition could be pulled in to be taken up to the fighting blocks. Mechanical handling equipment was quite good, but a great deal of physical work was needed to move and load ammunition. Rounds would arrive at the main magazine in wooden boxes, be transferred to stillages, transferred by train to the base of each block, taken up in the lift, then loaded one at a time into shell hoists to go up to the gun below the cupola of the turret. The shell hoists used an electrically driven helical screw to lift shells up, where the loader put them into the breech of the gun. Empty cases were dropped into a chute and helter skelter, which led all the way down the staircase to a collecting point below. Even this was made gas tight. The fighting blocks, complete with their staircase, were each sealed with a pair of blast and gas tight doors between the gallery and the staircase / lifts.

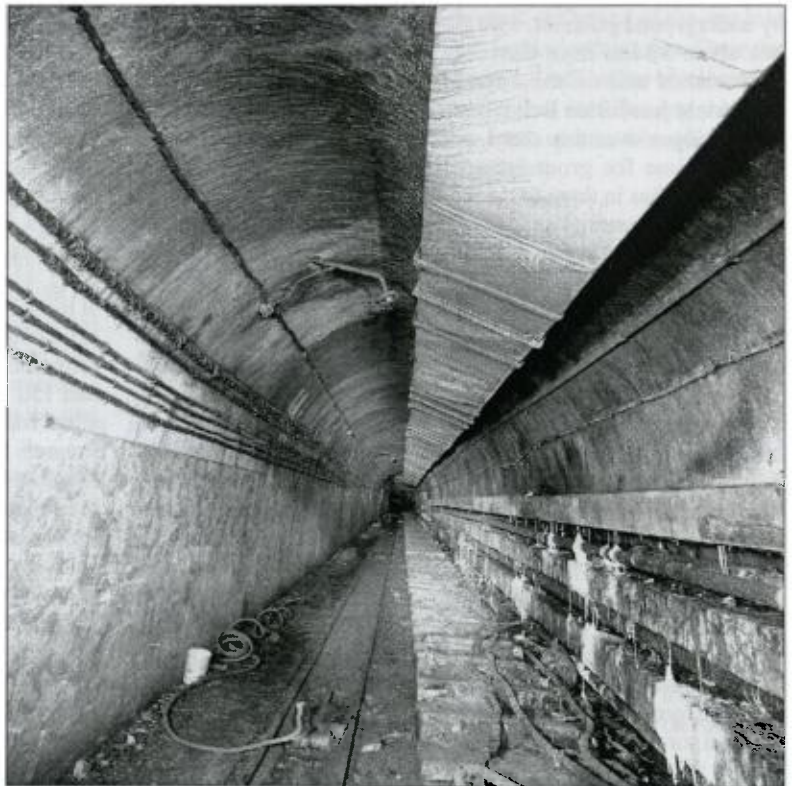
The Eastern part of the fortress is now in bad condition, due to ground heave caused by the expansion of anhydrite into gypsum. We were told that the staff had closed the blastproof doors to the eastern part and not visited for years. Since they have quite a large area left to play with, it is not surprising. The tunnels were formed in blockwork, not concrete and not plastered. Cables ran on concrete trays on the walls.

Hackenberg was used by the Germans as a factory, then they used the artillery against the Americans in 1944. On leaving, they tried to blow up the magazine, but did little real damage. Some concrete fell from the walls, but the ceiling stayed up. Most interesting was the damage elsewhere from this blast. The magazine tunnels turn towards the entrance, and the blast wave went 100 metres up towards the entrance, reflected off the closed blast door and went back down the main gallery, where it badly damaged another blast door, some 300 metres travel after the explosion. Because the Germans had cut away the lower part of the door frame to allow large factory machinery to pass, the bottom corner of the door was bent inwards by the blast - a door made of a sandwich of one foot

of concrete between inch thick steel plates and weighing 8 tons. This demonstrated the relative invulnerability of well constructed tunnels against blast which is not actually set into the walls.

The tour emerged from one of the blocks, and we saw evidence of the considerable damage done to them by shellfire (American) against their then owners (Germans) in 1944. There was evidence of poor compaction of the concrete, with gaps between the pebble aggregate. Nevertheless, the concrete held together very well against shellfire, so they were doing it well enough. The damage to all but Block 8 was repaired after the war by the French Army in 1955. These repairs were far more than required just to keep people out, and indicate that the French were maintaining fortress based artillery even as late as 1955, though the expected enemy would by then have been the Warsaw Pact. We also saw that some guns had been replaced with 1955 pattern. The staircases kept us fit; 150 steps from the block to the gallery level.

The next day was our first unescorted visit, to the fortress of **Billig**. Here we spent the morning underground in the seven blocks. The garrison was 550 men, serving five 75mm guns and one 81mm mortar, plus weapon positions for local defence. We wandered at our leisure, seeing much of the detail that we missed on the public tour at Hackenberg. The drawbridge and tank pit, slope shaft, drainage tunnel, cable tunnel and emergency exit shafts all caught attention. It was 1000 metres from the entrance to the furthest block. Some parts of the fortress were very wet. There was one large metal sign, originally blue with yellow lettering where the rust had pushed the lettering 1 cm off the surface and it hung there, crumbling away. The lift pits were all full of still, clear water - almost every lift we saw was at the top or part way up. The lift cables still had thick grease. There was a periscope cupola, with just a single vertical hole for the periscope to be raised using a concentric counterweight held on the biggest bicycle chain you could imagine. The staircases were of a common pattern, flights of 5 steps going up the sides of the lift shaft and protected by diamond mesh grille. One staircase had 58 flights of 5 stairs around the lift, 290 steps each about 7 inches high. Another I counted as having 304 steps. Many of the staircases were in very good condition, others chewed up where the metal edges had rusted



Maginot Line - Entrance tunnel at Billig

and crumbled off the concrete. Damp obviously contributed, but there may also have been different standards of construction. Here we saw the first evidence of heave in the floors, due to gypsum swelling. The drain at the far end in Block 4 was running with quite a flow of water. The filter room had banks of large drum filters, about 4 feet in diameter and 3 feet high. Someone had broken one open and granules of graphite covered the floor. The filters looked quite hard to manipulate. In Block 5 we found evidence of a limited amount of more modern wiring, coated in plastic. Also, in Block 2, 1 000 metres from the entrance, the lift had plastic coated wiring too. This could lend weight to the idea that the French Army had maintained some of the fortress artillery in the fifties.

Most interesting was the cable tunnel, labelled emergency exit on the map in Wahl's excellent book. A few steps led up to a rising sloping tunnel, about 3 feet wide and 5 foot 9 inches high, with an arched ceiling and running with water. Cable fixings ran along the walls, hooks like the London Underground on the left, and short vertical bars every few inches on the right to which cables could be clipped. There were four vertical shafts. The first was purely a cable pipe, a device looking like a periscope leading up through the roof of a small side chamber. The next chamber was the source of the water, and did not get too thorough an inspection because of the cascade of cold dripping water. It was a pair of vertical rectangular shafts, with two ladders of rusting staples set in the bare rock of the first shaft. The next two shafts were further on, where the tunnel became higher and the cable fixings looked newer. These were also vertical shafts, square at the bottom but then lined with concrete pipe sections. Here the ladders were fixed to stanchions set in the pipe sections, and seemed to be about 60 feet high. Finally, on the way out, we noticed a side chamber, about coffin sized with sand piled up. Visits elsewhere suggested that this was a chamber to pack with explosives for blowing the tunnel in the event of enemy attack through it.

Our afternoon visit was to **Fermont**, where we had another public tour. This was maintained until 1964, then abandoned, restored and opened to the public in 1977. The association which runs this fort has secured a great deal of material from other forts, and has an outside collection including parts of the movable turrets. Unusually, the munitions entrance had lifts, still in working order, to go down 18 metres to the main gallery. Most others had level entrances, or a slope shaft. Here was another train ride for us.

Keith Ward suggested we look for two Maginot Line fortresses reputed to be used as NATO command post and radio station. We drove off into the woods past rusty keep out signs and found the two entrances to Molvange. The munitions entrance had a barred gate with one bar missing, and thinner members got through, only to be stopped by the blast door 50 feet in, which was held shut from the inside and immovable. The people entrance also had a barred gate, but this was welded shut. In both cases, the ditch had newer railings than wartime, and we came away unsatisfied. Books say that it was modified by the Germans and NATO, and was still under care and maintenance in 1962. It would have been a good one to visit, being one of the largest, and is 1500 metres from entrance to the furthest point. A search for the blocks to find a way in was not attempted, because it was getting late. The plan also shows that all the blocks had only cloches and turrets, which are very unlikely to afford entrance - try breaking through 6 to 12 inches of a steel dome!

Close nearby, **Rochonvilliers** would have been the best of all to get into - but no chance. This is huge, 2500 metres from entrance to furthest point and with 9 blocks. This is still in the hands of the French Army, though probably only on a care & maintenance basis since the nearby barracks is deserted and decrepit (though still barred). We drove along the road and stopped at a modern fence, where two cameras, a flag and an intercom box with camera were ample evidence that the owners still did not want visitors. The original entrance block was obscured by a more modern

embankment as blast protection, built after 1968. A gantry at this embankment suggested that this may have been used for heavy materials - weapons store - though the literature suggests a command post.

Mettrich was the venue for the main event. Here we spent all day. 1500 metres from entrance to furthest point, ten blocks - but numbered as if 15 were planned. There was very significant heave of the floor outside the magazine, where the floor had risen as close as 7 feet from the ceiling (heaved up about 5 feet). One or two of the side galleries were badly affected, while others were untouched. This must have been due to local geological differences. Blocks 8 and 11 were paired in a way not seen elsewhere. A single staircase and lift led up 30 metres to an intermediate level, then passages led away to a separate staircase to each block, 35 metres above. In block 8 we found that the hand wheels in the turret would still elevate the guns and rotate the turret. Elsewhere, one of the turrets was made to rise, while Tony Page who was in the turret had no sensation of movement at all. Since the movable part of the turret weighs 20-50 tons (take your pick of stories), it was quite a feat for it to move after so many years of neglect. The observation cloche here, with its movable floor, was in very good condition, painted grey and with plastic covered wiring to bulkhead lights. One person had to make a second visit to Block 8, up and down 152 steps to retrieve a rucksack taken off to climb up into the turret. Some of the group climbed to nine of the ten blocks, about 1400 steps. None wanted to chance Block 7, where the passageway off the main gallery had either be blown up or suffered greatly from a collapse; it was possible to go up but inadvisable. In this area, large sheets of the cement rendering were hanging off the walls and ceiling, and the helmets seemed less important than keeping out of the way altogether. Another dodgy place was Block 10, the worst seen on the whole trip. The staircase was very wet, and the diamond mesh enclosing the lift shaft was completely rusted away for much of the shaft. At one place the cement rendering had fallen away on two sides, revealing blockwork underneath, some of which had also crumbled and was heaped on the stairs. The blockwork raised the question whether the block shafts were built by digging down or up. If they were dug upwards, it would be easy to do the lining in blockwork. If they were dug down, was the shaft left as natural rock until the bottom was reached and then the blockwork put in to line the shaft? At the lower level of the block, 153 steps up, there were beads of condensation on the ceiling, while the upper floor of the block was relatively dry. A channel cut in the floor of the lower level suggested that water ingress had been a long standing problem. Here we found a large welded steel water tank, which we later worked out was fed from rain catchment trays around the turrets. Block 15(232 steps up) had two 81 mm mortars, firing upwards through crenels rather than from a turret. These were apparently to fire for the defence of the entrance blocks, rather than for offensive use, and they only had a 45 degree range of traverse. Finally, the cable tunnel, about 250 metres long, had three vertical shafts, two capped at about 60 feet and one with tree trunks dropped down from above.

Back in the sunshine after 7 hours underground, we all set off to find the blocks above ground Using Richard's GPS receiver, Bob's compass and Cris's observation that the sun sets in the West, we found Block 15 and identified it from the unique mortar crenels. Then we navigated to Blocks 7, 10, 1, 4, 5, 7, 11 and 8. Though many were only about 300 metres apart, the trees and dense undergrowth made them hard to find. The real giveaway was to look for patches of sunlight, because bushes would not grow on the thin soil above the buried concrete. Only three blocks had any view at all, so the place must have looked very different in 1940 without the trees and bushes. At Block 5 both cloches had a jagged hole in the top, looking more like the effect of a thermic lance than explosive, and definitely not shellfire. At Block 8, there was an apparent repair to a cloche. On the outside, there were

concentric rings of welding about 15 inches across, while a steel plate could be seen fixed inside.

Our final half day saw us at **Galgenberg**, where we met Scott Sopher, a retired USAF officer living at Ramstein in Germany. He is a member of the society which runs the fortress, and gave us a private tour with the association's permanent employee, Jean Paul. After all our exploring in other fortresses, we sometimes already knew what Scott was telling us, but most items were in good condition. It was great to see the 17 ton blast door being pulled shut with a counterweight, making a boom as it closed against the frame. The staircases here were different, with shallower steps and only about 11 foot rise for every four flights around the lift shaft, compared to about 20 feet at Billig and Metrich. The cable tunnel here was the most interesting, having six shafts up three different branches, a total of 500 metres of tunnel, all stone lined. In this case, the tunnels were sewer shaped, whereas elsewhere they had straight sides. In the Command Post there were friezes around the walls, made with a stencil.

After a good lunch in a nearby restaurant, we strolled over to a small detached block, where we saw a lightly armoured searchlight, and some concrete dummy cloches and turrets. On then to an infantry position, an Abri, maintained by the same society, where we spent a long time frying to work out how the little drawbridges over the moat worked once you had dropped them. Finally, skirting

the lake serving a nuclear power station, we went to an observatoire, from where the artillery spotting would be done. This was a very compact block, but still well defended.

This concluded the trip and we raced for Calais. This was a wonderful 6 day intensive underground fortifications trip, very well put together by Dan McKenzie. We benefited from the linguistic efforts of David Ferris and Stewart Wild, while Cris gave some insights as a structural engineer and Tony made sure we were not too timid. A large number of photographs were taken outside and underground, and they will doubtless find their way onto the web soon. In particular, I am keen to see the Eben Emael photographs, because those in three books I have are poor.

If you want to make a side trip on a holiday in France, there are 14 places open as public attractions, though most are smaller than the large fortresses we visited and many open only a dozen times a year, so telephoning is advisable. Booklets at Fermont and Hackenberg are excellent, Hackenberg being in English with excellent photos and plans, while Fermont's has excellent cutaway drawings which make the layout and construction easier to understand. For unofficial visits, there are plenty of opportunities and few objective dangers if you beat a retreat where prudent. For those with less military interests, there is a huge number of stone mines around Maastricht. Go!

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Visit to Tower Colliery

On Sunday 22nd May an underground visit was arranged to Tower Colliery at Hirwaun, Glamorgan, the last working deep colliery in Wales. Tower Colliery first opened in 1864 being named after a nearby folly 'Crawshay's Tower'. British Coal announced closure in 1994 but the workforce were determined to keep the pit operational, confident that they could run the mine at a profit despite British Coal's claim that 'it would be uneconomic to continue production'.

A plan was drawn up by the N.U.M. Lodge for the miners to buy the company and with the help of a 1.5 million loan from Barclays Bank and an 8000 investment from each member of the workforce (1.93 million in total was raised) they were able to re-open the pit on 3rd January 1995 under the name Goitre Tower Anthracite.

By December of that year the company has returned first year pre-tax profits in excess of four million pounds and despite a set back in 1999 when high levels of methane (Tower has always been a very gassy mine) forced production to cease for three months the future for Europe's only worker owned colliery looks rosy. They even turned the high levels of gas to their advantage as they have now joined forces with Hyder to use this methane to generate enough electricity to run the mine with surplus being sold to the grid.

Our visit was on a Sunday which was a maintenance day so we were unable to 'get a lift' on the conveyors to the working face which is five miles from shaft bottom. Normally the workforce are able to ride the coal conveyors for two thirds of the distance and the walk the rest. The thought of a ten mile walk to the face and back did not fill us with enthusiasm so we opted for a tour around the shaft bottom.

Having dispensed with watches, mobile phones, lighters, matches and tobacco products (anything that could cause a spark), we donned boots and orange overalls and made our way to the lamp room to collect our lamp and self rescuer. We then walked the short distance to the shaft passing through an airlock and entered the two level cage at the bottom level. Tower is basically a drift mine with the coal coming to the surface along a three quarters of a mile inclined drift constructed in 1958. The shaft, which was

sunk in 1943 is 520 feet deep and is used for return ventilation and transporting the workforce.

Once away from the bottom of the shaft it became unpleasantly warm and as we walked down a steep incline towards the bottom of the drift it was at times difficult to walk against the rush of war air trying to escape after its journey round 18 miles of roadways within the colliery. Having passed through another airlock into a somewhat quieter and cooler area we were able to visit the underground workshops where there is a permanent staff of engineers ensuring a variety of different vehicles are kept running. Some of the dumper trucks that were being worked on today were capable of carrying loads of up to 8 tons. The mines has lost its internal tramway although there is still plenty of evidence of it on the ground and the coal is now removed from the retreating long wall face to the conveyors by huge road vehicles. From the workshops we passed the now sealed roadway linking Tower with Maerdy Colliery to the south (closed 1990) through two compressed air operated air locks to the two level conveyors at the bottom of the inclined drift. As well as being used to transport the coal to the surface and the workforce to the face, the drift is also the intake airway and the air in this area was unpleasantly cold and gusty, we didn't stay long.

By now, our all too short underground visit had come to an end and it was time to make our way back to shaft bottom, we were not looking forward to the long climb up the inclined roadway in a 90 degree gale. Luckily there was a man riding conveyor to aid our passage. Normally the workforce would be expected to jump on the moving (6 m.p.h.) conveyor and jump off again at the appropriate time. Luckily our guide switched it off and we were able to lie down on our stomachs ready for the upwards journey. As we started to move our guide ran along the conveyor, dodging bodies in order to switch it off again as we reached the top.

Having ascended in the cage we went for a shower before commencing a tour of the surface workings.

The following were present: Nick Catford, Neil Baldwin, Vince Alkins, Kim Alkins, John Hine, Paul Thorne .

Nick Catford 23.5.2000

Visit to Dover

On the 15th April 9 Members of Sub Brit, Nick Catford, Dan McKenzie, Tony Page, Robin Ware, Neil Harley, Graham Old, John Peacock, Matthew Wood & James Wood, braved some atrocious weather to visit a few of the many disused tunnels located in the Dover area.

During the early morning it had rained heavily but as we assembled at the first meeting point near Folkstone the rain had stopped and as we started the mile walk to the 1880 Channel Tunnel attempt at the base of Abbot's Cliff the sun began to shine. Unfortunately, the coast path which had been little used at the Abbot's Cliff end has recently been converted into a nature trail and with the influx of passing pedestrian traffic, Railtrack have upgraded the entrances to a series of drainage tunnels that run underneath the railway line. One of these tunnels (No 20) intersects the earliest attempt at driving a channel. The entrance to the tunnel which had for many years been secured with a large nut and bolt is now securely padlocked and we were unable to gain access.

We had intended to visit the deep level shelter at Lydden Spout Battery next but as this involves a traverse across a sloping cliff face. I decided this was too dangerous today as the chalk was very wet and slippery even though we had safety lines. We'll try again on another dry day.

Our next port of call was a World War 2 RAF underground radio station located at the base of Long Hill, Buckland on the east side of Dover, half a mile north of the Castle. (TR31484317). By now it was raining really hard and the rain continued on and off for the rest of the day. Entrance is through a small concrete structure at the base of a steep wooded slope. The entrance tunnel is 250 feet in length, six foot high and five foot wide lined with galvanised corrugated steel sheeting fixed to 'H' section rolled steel joists preformed to fit the tunnel dimensions. At the far end of the entrance tunnel is a dog leg (for blast protection) incorporating three short storage tunnels each a few feet in length. This tunnel opens into the hub of the radio station which consists of two parallel drives at right angles to the access tunnel. These are of a larger dimension being 10'8" wide by 8' high. The southern tunnel has two small storage tunnels and the north tunnel has a 30 foot long arm at one end containing the remains of the ventilation system. These tunnels contain the ventilation ducting, a number of pipes protruding from the ceiling which took the aerial cables up to the surface on Long Hill remains of dividing walls and instrument and equipment mountings are visible on the floor. At the eastern end of the southern tunnel the dimensions revert to the smaller size with tunnels going round in a square with an inclined passage (probably originally steps) up 50 feet to a higher level entrance. This stairway was partially backfilled after the war and the entrance itself, which is still visible in the woods on the surface has now collapsed after a few feet. Several of our party attempted to go up the slope but it is tight and loose and most gave up after a few feet. Graham Old managed to get about half way up sending timber and chalk blocks down behind him but eventually he too gave up when it became too tight.

We moved on to St. Margaret's Bay where a series of tunnels leading to lookout positions high in the cliff are still accessible.

(TR36764432). Up until a few years ago there was an easy walk in entrance at the southern end of the promenade but this is now securely bricked up and the only access is through one of the lookout positions 20 feet up the cliff face. We had a 12 foot ladder which had been adequate in the past but recent beach erosion left the ladder well short. Luckily there was a thick knotted rope dangling from the protruding brick lookout position we were able to get access to the tunnels. I will describe the tunnels from the now blocked entrance. The main access tunnel through unlined chalk is about 230 feet in length bending to the left. It is 8' wide and 7' high. At the far end it turns sharply to the left and narrows to 4' 3" through a series of brick supporting piers for approximately 160 feet. Half way along this passage there is a cross roads leading right to a parallel passage and left for 50 feet through more brick pillars through a door into the small brick built observation post/gun position where we gained access. Returning to the end of the two parallel passages, there is a second cross passage and steps up 30 feet to a wide open platform 50 feet up the cliff face supported by a central brick pillar. There are some electrical fittings still in place and some WW2 graffiti visible on the walls.

From the bay we drove back up to St. Margaret's at Cliffe village to visit the deep level shelter for the Z Rocket Battery. Access to this network involves dropping 6 feet down through a hole in the grass a few feet from the cliff edge onto a very slippery slope alongside a footpath at TR373452. The hole is covered by a heavy metal grille pinned to the ground (there is a locked door in the middle for access). A hand line for safety was required here as at the bottom of the slope (probably originally steps) it is easy to plummet through a hole in the cliff face to the beach 80 feet below. Instead you should turn sharply to the left where the main 150 foot long access tunnel, mainly through unlined chalk with some timber props leads to the two parallel drives of the air raid shelter. These tunnels with several cross passages linking them are lined with galvanised corrugated sheeting and at each end there is a blocked stairway to the surface.

Having looked at the Rotor bungalow a short distance to the north of the Z Rocket Battery site we drove to South Foreland Battery where we entered the battery plotting room at approx TR361437. There is a small concrete blockhouse with a hole in one wall. Dropping through the hole there is a 12 foot iron ladder giving access to the plotting rooms which have suffered badly from smoke damage in recent years. Underground all the blast doors linking the various rooms are still in place with the wording 'Plotting Room' still clearly visible above one of the doorways. Various instrument and machinery mountings are still visible and one room still contains all the ventilation plant. We then visited an underground magazine diagonally opposite the plotting room and the less rotund members of our party went on to another magazine at the west end of the site that has been recently re-entered by local children. Alas some of us were just too big to get in.

Despite the inclement weather I think everyone had an enjoyable day visiting just a few of the many tunnels/bunkers/shelters/fortifications in the Dover area.

Nick Catford

From our Scribe in the West

SLATES FROM ABERGYNOLWYN

Further to previously noted item in Guardian 22-4-00 about Bryn Eglwys slate quarry in Wales being "opened to visitors" that day, you can now (as May 2000) read what a review in "Narrow Gauge News" magazine describes as "a comprehensive history of the quarry operations and the association with the railway" (which carried the slate away). A 1986 book by Alan Holmes, titled as heading above, was sold out soon after publishing but has now been revised and reissued, published by Gwynedd Archive Service. For £7-99 including postage, you get 121 pages of which 28 are illustrations, also maps and line drawings within the text. The quoted review suggests ordering from Tallylyn Railway Shop, Wharf Station, Tywyn, Gwynedd LL36 9EY. (My apologies if Sub Brit has other preferred reviews or sources for this book.)

THE SMELL OF MONEY FOR COMBE DOWN

100 firms (meaning at this time consultants) from the "specialist construction industry" were "clamouring for £30 million mines contract" according to Bath Chronicle 5-5-00. B&NES council project leader Frank Palmer said he was "surprised at the level of interest shown so far". How odd, that this was a surprise. Does a bear like honey? When money is waved about, a swarm of eager bidders naturally gathers anticipating a feeding frenzy. Frank added that "It is quite an expensive and challenging project that would appeal to a wide range of consultants, both from the engineering and environmental protection world".

After the May 12 deadline for bids, the winning "consultant or team of consultants" were to "draw up plans for the stabilisation of the old disused stone mines which honeycomb the area and which supplied materials for some of Bath's best known buildings". After completion of "costing the proposals and analysing what environmental impact the work will have", it was hoped the B&NES project team would appoint a contractor to carry out the work itself, the dream being to reach that point sometime in 2001.

This now looks like a race to perform the game of ducks and drakes to ceremonial completion of paperwork before a General Election, when realism tends to dictate "all bets are off". This political "Ground Zero" for milking the largesse is spoken of (by media pundits) as perhaps a year from 5-00. Then, after a gap for the flying fur, feathers and teeth to settle, the whole tedious rain dance may have to be begin all over again from the start with whatever "new" administration gains office. Some other honcho in a spotless white boiler suit would eventually descend into Firs Field, emerging to pledge urgent support works with "Groundhog Day" familiarity.

BLACK HOLE THREATENS COMBE DOWN WORKS

Bath Star, probably using copy from Chronicle, commented 19-5-00 on likely implications for B&NES Council "bailing out" the troubled "Bath Spa Project" (which some see as a sort of local Millenjum Dome type of folly, fast becoming a financial black hole). Dutch contractor Thermae Development Company failed to stump up their promised £5.1 million share of the (spiralling) £19 million cost, by August deadline. Local Council Tax payers must hence grin and bear a minimum 12 months wholly funding the "Project" whilst an alternative "partner" is sought. And if nobody fancies participating, we are told a write off cost of "at least £4 million" is an "unthinkable" option to take.

Tucked away in the small print, Star lists Combe Down Stone Mines stabilisation Project among those schemes expected to be "jeopardised" (means not funded) as a result of the Council "going it alone" with the Bath Spa undertaking, as "sole underwriter". This

shows what a bottomless money pit it could develop. The promised potential annual revenue of £3.8 million upon completion is, thinking persons will realise, an illusion. Central Government will skillfully claw this back by a matching reduction of direct support given to B&NES, as is their cynical way. We (whether Council Tax payers or Combe Down residents or both) could once more be left hoping for the Tooth Fairy or Father Christmas to save the day.

Sensing growing public hostility, B&NES council promptly adopted a sloped shoulders posture to slough off responsibility onto "independent financial and cost—control advisers". Bath Star 9-8-00 said the advisers were to be appointed at a council meeting that week, to "help the District Auditor after members of the public expressed concern over how the Bath Spa scheme had been handled". The council were also quoted "claiming this is critical for future major projects and partnerships such as Combe Down Stone Mines". Fingers crossed, beads of sweat raised on brow. In the back of many minds must lurk unspoken concern that the Millenium Commission might yet decide to withdraw their grant of "nearly £7 million" for the Bath Spa project.

MONKTON FARLEIGH DEPOT

A quick visit 11-5-00 showed 19 District slope shaft had recently been walled off completely at the top and 20 likewise, except for a central space at 20 to suit a pedestrian door (which was reported in place by 18-5). Whether this was an eventual response to the violation of an underground wall previously noted from 2-00 onwards is a matter for speculation, though a gruff local pundit was heard in the pub pontificating on it being a "legal responsibility" to block access. It was obvious that no effort whatsoever had been made to tidy up the litter and rubble strewn down 20 slope shaft, before blocking off vehicle access at the top. Nor does there appear to be any provision for bat access. Of course, we keep being told that no bats have been seen in there.

Following gruesome reports of a male cadaver found hanging in "a disused barn" at a location consistent with the old Farleigh Down Sidings covered slope shaft entrance, a brief and inconclusive check was made 20-6. It would seem to be hard work devising an effective rope support there, and other disused buildings exist nearby (one collapsing onto a classic car). Many bunny rabbits scattered in panic along the old military approach road for the loading platform, the way being generously strewn with recently expended bright orange 12 gauge shotgun hulls. Coney stew was quite likely bubbling on a hob somewhere nearby.

BAT GATES AT BROWN'S FOLLY

Remembering how previous entrance blockages were quite soon removed, there was no surprise when two of the nicely galvanised new gates were noted to have completely gone when visiting in late July. Only their supporting frames remained. Perhaps concerned that children or animals might enter, someone had piled rocks to fill Shakespeares entrance. (By this time, none of the new gates had yet actually been seen locked.) No effort was made to check if other gates were still in place, though a new "bat entrance" had recently been bashed through a 4ft thick masonry wall and gated in a manner indicating human access was not expected to be routine. This will be ventilating a previously remote and somewhat stagnant part of the mine, surely a good thing for those humans toddling round to admire the scenery.

BAT PRIORITY

Extreme lengths to which a property developer can be inconvenienced for bat habitat preservation were demonstrated on

the outskirts of Gloucester, reported by Sean O'Neill in the Daily Telegraph 28-4-00. In order to get permission for 33 "luxury homes" on the site of a hospital closed in 1993, a developer had to rehouse a colony of about 50 lesser horseshoe bats which inhabited the former boiler house at Over. They were the first new residents to move in to the new estate, enjoying their very own £40,000 bungalow measuring 36ft by 24ft with "cold basement for hibernation and a roof space that will provide a breeding area".

Sean remarked that (unlike other residents) the bats go out every night and sleep all day. Claude Elliott of Gloucester Bat Group was quoted saying "they will make great neighbours".

FOR THE PRICE OF A LONDON FLAT

Daily Telegraph property section for 15-4-00 announced that Conrad Ritblat were expecting to auction Beamish Hall (Co Durham) at a London Hotel in July, for an anticipated price as titled

above. The collection of buildings date from a variety of eras and reflect changing uses over time, most recently (until 8-94) a County Council residential adult education centre. Vacant possession arises from expiry of office space lease and consequent departure of Beamish open—air museum administration.

Among the wealth of detail revealed in the Telegraph item by Peter Birkett, who says "You could lose yourself in it" because there are so many rooms nobody can reliably count them, your scribe spotted the following tasty morsel; "Down in the bowels of the house, the extensive cellarage does not seem threateningly damp and, intriguingly, is said to provide access to at least two bricked-up passages." This could, of course, be hokum. The same item asserts the house is haunted by the ghost of a young woman who "died in a cabin trunk in the cellars after being incarcerated there to prevent her visiting the son of neighbouring Pockley Farm."

Make what you will of it. Someone might perchance be in a position to investigate the alleged passages, were they so inclined. The "grey lady" seems fairly unlikely to trouble them, as she reputedly appears on a bridge in the grounds rather than in the cellars.

ROSSLYN CHAPEL

Further to information in Daily Mail 10-4-00, the chapel and speculation about sealed vaults beneath featured in an HTV programme "Beyond The Truth" (made in 1997) broadcast 15-7-00. Sadly it was the sort of "tabloid journalism" presentation which makes sorting wheat from chaff all but impossible for the objective viewer. But there was plenty of interest for idle speculation about this and indeed other tenuously linked underground spaces overseas. Those in a position to provide answers evidently refuse to do so and no doubt have their reasons. Cynics remark they probably make a great show of having something to hide either as a calculated distraction or to boost their own status as alleged guardians of something mysterious. At which point, we shrug and move on.

SECRET ARMY

Under the above title, Bath Star 12-7-00 published a piece by Jacqui Williams with a picture recently taken inside an old WW2 bunker, apparently created by enthusiastic Home Guard members. This was the fourth to be built "after a series of problems" by the late Len Marsh and Ken Weekes in 1941. The idea was to "operate behind enemy lines incase of invasion", for which the bunker formerly contained "a cache of ammunition including Molotov cocktails". A clue to its being in a rural location is that "poachers were a constant (security) threat". The wording tends to imply it is under land now belonging to or controlled by Len's son Peter who "cleared and covered it over in 1999 for safety reasons". At that time, he found and removed bottles "which may have been used to make the Molotov cocktails".

The bunker is 9ft wide by 7ft high. inside, constructed from the then ubiquitous curved sheet iron. In the picture, it appears very corroded and suffering from distortion at the top (though that may have been a peculiar camera lens effect). A blockwork wall is visible at the end, with a central 2ft wide recess containing an earthenware vent pipe. This recess apparently served as "an emergency escape route". Access included "a lift where cables had counterweights attached and the vertical iron bars acted as guide rails".

A recent display at Southstoke included "a board devoted to the Home Guard and how bunkers were created". Visitors wrote their wartime stories or recollections, prompted by meeting up after 20 to 30 years. Professor Robert Parfitt is supervising efforts to create a book, having put a selection of material from the display in a file afterwards. "A tremendous amount of material" started to be collated about 3 years ago. A previously published book about the bunker unit was called "Sir Winston Churchill's Secret Army".

Your scribe also recalls seeing an article about what were probably other bunkers for the same purpose published (perhaps 15 or more years ago) in Telegraph weekend magazine. This included -whimsical 1940's cartoons showing risible ideas for confusing the invader eg by making road signs point the wrong way, actuated from a mechanism in a resistance bunker.

ENTOMBED ENGINE

Having been prompted by the "time capsule" containing a mini car welded shut 23-3-00 to recall an allegedly entombed locomotive, scribe was pleasantly surprised to see that story, not only confirmed but said machine actually depicted in 8-00 issue of "Railway Bylines" (Vol 5 issue 9) during its operational life. It is a Ruston & Hornsby 25/30 horsepower diesel of 2ft 6ins gauge, their works number 195865 built in 1939, shown wearing a "home made canopy" or flat roof over the driver's seat. The location was. Nettleton ironstone mine in Lincolnshire which was opened in 1934. Using only Ruston diesels (built nearby at Lincoln), the railway hauled ore from working face to an aerial ropeway, which in turn took it to standard gauge loading sidings near Holton-leMoor station on the Lincoln to Barnetby line.

As to the loco in question, this was "placed in store inside the mine" in 1966 but "buried by a rockfall the following year", recovery deemed impractical or uneconomic. Unlike the story as previously heard, this version implies the loco actually being crushed under rubble rather than merely isolated. Perhaps we may never know for sure but either way, as the magazine says, it is "still on site" which could be deemed a better situation than that of the majority. Many were scrapped, melted and no doubt sold back to us as Japanese motor cars or disposable razor blades.

Scribe keeps one surviving Ruston (of 20 horsepower) as a kind of house pet, lurking in a wooden kennel beyond the rhubarb patch. Two more like it (but with exhaust scrubbers) still linger in limbo within the old Tunnel munitions depot beneath Box, not so very far away in Wiltshire. An attempt (by others) to fetch one of those out was defeated, leaving it shorn of external tinwork. The other even has the starting handle sticking temptingly out of the side, ensuring it gets a casual wiggle at intervals so the engine does not seize.

MOLES AND ROCKET GUNS ON TV

BBC1 Points West "Access All Areas" by reporter Mark Cummings (of Radio Gloucestershire, apparently) featured the Mole family being shown around passages twenty feet beneath Bath's York Street and Stall Street, in a broadcast 6-9-00. Their guide was Stephen Clews, Roman Baths curator, He pointed out Roman tiles which were "pulled out of the Great Bath around the time of its discovery" circa 1880, which would have formed a large covering roof in the 1st Century AD. The Cold Bath still contains water, though this

looks filthy, and has had three square brick pillars sprouting up from it since they were built to support the road when trams were introduced to Bath in 1904. This footage gave a good impression of how the supporting vaults were built to raise street level above risk of regular flooding from the river Avon, in the days when anticipated traffic was light carriages and sedan chairs. Heavy concrete beams, and deep foundations for modern buildings, have been inserted in various places and were prominently visible either lowering the headroom or forcing the explorers to turn aside avoiding these modern severances.

The following day's "Access All Areas" was trailed as being about "a secret city beneath the Somerset hills", echoing the old publicity slogan of the former Monkton Farleigh Mines museum. There was a "spectacular defence system and one of the best kept secrets of the second World War". Donald Brown, author of the book "Somerset versus Hitler", and Corporal Robert Ring returned to the site for the first time in 50 years to describe how it was created and recount their wartime memories of enemy encounters. The Sunday after the broadcast, your scribe and four others went to check out the site for ourselves.

After St Philips, Brislington and Temple Meads areas of Bristol had been pounded by devastating night time bombing raids, a decoy was created 12 miles away on the Mendips to spare the city further damage. Various described as "special lights in boxes" or "lines of lamp standards and little buildings", a strategic layout to mimic street patterns could be operated "like a huge theatre" from two bunkers. One was near Tynings Farm, the other some distance away with the lighting area on moorland to one side. Everything was suddenly switched off as German bomber aircraft approached, simulating a city blackout. Once bombs had been dropped, fires were lit to give the impression of successful strikes.

Robert King was based at Chew Magna, tasked with assembling the lights and building the controlling "Blackdown Bunker" in conditions of great secrecy. The featured bunker is an earthed up brick box with concrete top (spalling slightly inside in places, after 50 years) and brick blast deflecting wall for a central entrance. It is divided into two rooms, one still having mountings on the floor for generators and the other having a square emergency escape hatch in the ceiling. The floor is rather below mean ground level, though this is not apparent because earth was scraped up from the general area for additional blast protection. The location is just on the edge of the moorland, before it falls away towards the farm buildings.

This simple shelter was the only protection from the bombs which were attracted. It was "really scary" when these began to fall, with terrific noise in addition to the loud engine noise from the German aircraft. On nights when the decoy was successful, the defensive rocket guns were fired and then "it was just like being in hell" as the whole bunker seemed to lift with explosions. One bomber was thought to have been shot down by a rocket, which would have delivered an exploding shrapnel shell with shredding effect over a significant area. The downed aircraft had to be credited to AA batteries at Weston Super-Mare as the decoy "did not exist".

The rocket guns consisted of cast concrete bases with welded constructions of scaffolding erected on top to launch the rockets. There was no mention of provision for aiming. Operators were given verbal instructions, nothing being written down "for fear of compromising secrecy". However, similar rocket guns have been described as used in other places at the same time so they were not, in themselves, a secret or experimental weapon.

This clever decoy facility must have saved countless lives, as bombs meant for Bristol fell harmlessly on the moorland. A photograph (presumed to be recent) taken from high above showed the land still bearing a visible pattern where mimic street lights used to be laid

out. They are now just rough tracks, or breaks, through a blanket of bracken. Not surprisingly, the interior of the bunker is waterlogged and strewn with rubble, daylight entering from above through the hole in the roof where the escape hatch used to be fitted and through a large ceramic pipe which was probably an air intake. The escape hatch, one presumes, was a precaution against entrapment of operators should a "near miss" choke the central entrance with debris.

Out on the moorland, the sea of bracken obscures any concrete bases for rocket guns that may survive and quite probably some unexploded bombs. Boggy areas could perhaps be caused by cratering from the bombs that did detonate. The ants were swarming infuriatingly and local lads on trail bikes were assaulting our ears with their horrid two stroke engines, so we did not linger to search for a specified second bunker. This could possibly be located by following a most clearly defined break in the bracken, for a considerable distance, with lesser breaks crossing it where the false street pattern once existed.

REDCLIFFE CAVES

These entirely man-made spaces are nibbled like a random maze into red sandstone beneath Bristol, They actually do not include any natural caves, despite their name. Mined sand was used to make cheap dark green or brown glass bottles and to make a slip for glazing pottery. Coal for these processes was locally obtained from Bedminster, used in cone-shaped glassmaking kilns the largest of which was about 50 feet in diameter and originally 90 feet high. The ground floor part of that kiln (dating from 1780) is now the restaurant of the Hilton National Hotel in Redcliffe Way. Spanish prisoners were held in the caves during 1741, then French prisoners in 1744. References to the caves being used by smugglers seem to have arisen naturally as myths prompted by the proximity to water and harbour commerce. Academics also assert that slaves were never kept in the caves, as the pattern of trade seems to have been inconsistent with that.

By 1784, the caves were in use for storage (of exotic goods including, we are told, elephant tusks and barrels of palm oil) but had been partly or largely forgotten when accidentally broken into by workers digging a broad gauge Midland Railway tunnel in 1868. The names G. Gardiner and A. Edkins were engraved in a small chamber on a wall dated for that year, the inscription still being legible now. The tunnel is disused in our time but remains with an entrance visible from the harbour. The Midland Railway Company did a survey when they bought the King's Wharf (associated with the caves) in 1868. Certain areas being deemed unsafe, railway style brick arches were built underground to support cracked roofs.

Plumber William Watts converted his house above the caves into a lead shot tower some time after inventing his process for making musket balls in 1782, as an efficient alternative to casting them in split steel or brass moulds, Molten lead was dropped from a considerable height into water, forming serviceable balls. There was access into the caves from this industrial process, through a "dumping shaft", recent excavation of which revealed items of pottery and bottles. The largest underground cave chamber has a floor still covered with slag and ash apparently from that activity. However, the actual base of the tower (demolished in 1968) has not yet been located during modern explorations by Axbridge Caving Group. It is hoped some interesting finds may be made there, Digging is estimated to be within 50 feet of the tower base, this being a second attempt after foundations of the Coliseum pub prevented forward progress through the clay infill. An unstable cave roof which this digging revealed will have to be shored up.

The caves were entered during the 19th century through a small tunnel with a house built on top and partly into a sandstone cliff face. The remains of the old oak entrance door can be seen from

underground today, protected by being walled up from outside, the house being completely gone and another entrance used instead. Further into the caves, there is a vertical shaft presumed to have been used to raise goods unloaded from ships, up to road level above. When seen from underground, the top is capped with old timbers and possibly more solid material above that. Those investigating the caves assert that what they call a "narrow gauge railway" extended from the entrance (at the wharf) to the base of the shaft. Scribe was unable to check this out, however. The press of excited human bodies on the day rather mitigated against proper sleuthing.

Although newspapers reported investigation of the caves as possible air raid shelters in 1938, only a (separate?) smaller cave was actually put to that use until 1942, being fitted with bunk beds for up to 30 people. They were hiding from the bombing referred to in another item above, about a decoy. Children at St Mary Redcliffe Secondary Endowed (boys) School were able to look down into the caves through a bomb crater in their playground, after a 1941 raid. The crater was only infilled and the caves walled off (underground) "for safety reasons" in 1949. This area remains unexplored from underground and is therefore not detailed on the modern survey of the caves.

The proprietor of a local antique shop, when asked for directions to the caves, volunteered with glee his story of an associate who went exploring the dark and deserted spaces armed against the unknown with a pinfire revolver. He emerged without it much to his annoyance, swearing he somehow dropped it along the way and never saw it again. No doubt this tale has prompted some futile searching by gullible fools since then, hoping to retrieve a corroded relic antique firearm lying unregarded on the floor but only bumping their heads instead whilst thus distracted from the uneven roof.

Various film companies have made rather free and wanton use of the caves in more recent times, not bothered at all to clear up after themselves. Curious symbols painted on walls and cheaply faked expanded polystyrene "rock" with "old wooden doors" set in them were left behind after scenes were shot for an adaptation of Enid Blyton's "The Famous Five" and another children's TV series. "Aquila" (which scribe admits to covertly watching betimes). A brick structure containing what looked upon brief inspection much like human remains may, or may not, have similar origin. Foundations for buildings above have been most wisely built in the caves at various times, some of masonry but those for the Sun Alliance or, Redcliffe Hill of concrete cast in place with shuttering, some shards of which remain entrapped at the ceiling.

Three capped shafts which lead to the surface within the caves have recently been investigated, one featuring horizontal passages extending for about 50 feet. Another has had rubble removed but not yet enough to establish whether it was sunk into the floor. The third shaft does extend below the floor by at least 15 feet, though rubble has obscured the water it used to contain. Tests showed this was salty which indicated a link with the dock and prompted speculation it may have been for dumping sewage. At the end of a passage there is a large and now dead root from a sycamore tree which has penetrated through 18 feet of rock in search of water, continuing down into the cave floor. The tree, which was in a car park above, has now been cut down and removed. Drainage channels cut into the floor in various places, and even a metal cone for gathering water from the roof, most likely date from the period of use for storage of trading goods.

Modern investigation and surveying of the caves has been organised and carried out since 1994 by the Axbridge Caving Group, which continues this work and also provides tours for visitors by arrangement. A public access day was held on 16-9-95 with some 6,000 people being shown around during the six hour period. Scribe

and associates took advantage of a similar occasion 17-9-00 which seems to have been equally popular. It was not possible to see the whole extent of the passages in the time available, visitors simply following a marked out trail with features deemed of special interest identified by numbered boards affixed to the walls.

For those of you who are plumbed into cyberspace, there are apparently 60 pages of stuff on the internet about the caves and local history of Redcliffe. Evening tours lasting about two hours, which would enable much better exploration than scribe could manage on his visit, can be set up by contacting Alan Gray of 42 Maynard Terrace, Clutton, Somerset BS39 5PW (telephone 01761 452288) or plugging yourself in to www.bristoltoours.com Axbridge Caving Group have a web page at www.axbridge.org.uk or you can phone Alan Gray (number above) or John Dobson, on 01761 221861.

BUNKER THROWBACK

Graham Gardner reported for BBCI local TV news "Points West" 18-9-00 from the "centralised emergency planning command bunker" of Gloucestershire Council "deep within the bowels of Shire Hall" in Gloucester. What we were shown was a single oblong shaped room with heavy roof beams (encased), strip lighting and white paint decor, a scribble board crammed with felt tip pen notes on one wall. Modern office tables, computers and telephone equipment were arranged around the edge, with lots of people bustling about and much urgent babbling on the lines.

Originally designed for the Cold War, the bunker had previously only been used once "for real" during "an incident two and a half years ago triggered by a chemical fire at Avonmouth", though there have been training exercises. The facility "swung into action" to "co-ordinate response to the fuel crisis", ironically just as pickets were withdrawn from oil refineries. Volunteer telephone operators took nearly two thousand calls from the public during three days, showing a need for up to date information on fuel supplies locally. With 15 schools closed in Gloucestershire because teachers could not get to them, refuse collection interrupted and cuts to bus services, this central information hub was (though briefly) very active. Its coming out of mothballs "shows how close the fuel crisis came to bringing the region to its knees.

SAD NEWS OF CHWAREL WYNNE

Scribe was reminded, by finding a simply printed green inked leaflet when sorting out stored papers, of a visit now perhaps ten years ago (and probably more) to this privately preserved underground slate mine at Glyn Ceiriog near Llangollen, then open for visitors. A solitary youth guided a small party round the large chamber, speaking of bat inhabitants and deeper workings now unsafe. The place was otherwise devoid of people, save for a nervous lady about to lock up the little craft shop as the day was ending. She was coaxed into a brief discussion.

Quizzed about the narrow gauge diesel locomotives dotted about the site each on their lonely stub to rail, this lady spoke of there having been rides for visitors but the track "had to be sold" and there was something (which did not seem to make sense) about "driver training" being a problem. Even more puzzling was a reference to her husband "having the radiator re-cored" on the Simplex loco that forthcoming winter. How odd, thought scribe, for a loco with no track to run on and no plan to install any.

Now it happened by chance that this subject came up when chatting to a customer at an exhibition in Wales during 9-00, prompted perhaps by the locomotive photo album deliberately left about to goad clam-like potential customers into some spark of interest. This fellow was evidently in an intimate position of knowledge regarding decline, closure and subsequent decay at Chwarel Wynne. The husband (who

had been absent on occasion of scribe's visit) had died, leaving his wife in some desperate financial straits as she "had to sell all the trees" which have thus been felled, ruining the place and leaving it bleak. He said she was now "a lonely and frightened old lady" and it would be unkind to visit unannounced. Apparently, the locomotives and a row of wooden bodied wagons near the mine entrance do still linger on, doubtless now neglected since the demise of the former museum facility.

Perhaps worst news of all was the predatory threats of grim mindset administrators in offices, that this lady (as owner) would perhaps be compelled to pay for the mine entrance to be sealed up by blasting with explosives. Having gotten the idea that some of the workings are "unsafe" and the lady being understandably not keen to finance "remedial work" in the absence of paying visitors, a more drastic response seemed (to the suits) to be in order.

The chap relating this stuff appeared to be a competent and reliable source but scribe had forgotten the conversation, as it took place in among crush and confusion of a hectic weekend exhibition, until coming upon the old leaflet. Rather stupidly not writing the date on the leaflet, it instead merely bore a biro inscription "BEAR" RH 3VSHL 284659 3ODL No 339209. This means, no doubt, that a fuller record of that visit was later published somewhere in the piles of Narrow Gauge News magazine back issues now entombed in storage.

BUNKER FOR SALE

Cecil Thomas bought an underground nuclear shelter 30 years ago when it was declared surplus to military requirements in the late 1960's. He was farming the land where it is situated at that time and thought his wife and three children could "hide there for the duration" in the event that "the worst happened". Looking back at those times, he now thinks he was very naive and that he would not want to survive in such a nightmare (postnuke) world, So he has put the bunker up for sale by auction and says this has attracted some interest, which includes an author looking for a place to write.

The 12ft x 8ft chamber is situated 12ft underground beneath a dense copse. It was originally built for the Royal Observer Corps on a plateau near the village of Ditton Priors, having a view of the Birmingham conurbation 30 miles away. Access is by a steel trap door in the top of a rectangular concrete entrance which rises above surrounding ground level. A ladder is no doubt used. Furnishings within boast three bunks and a desk, condition unstated. This item in the Daily Telegraph 16-10-00 included a picture of Cecil perched half in and half out of the entrance lid, enjoying his own little "peace dividend".

DOOMSDAY SEED VAULT

This item was partly missed and not repeated in subsequent BBC 1 TV news broadcast 18-10-00. A new underground bunker somewhere in UK is just coming into use (apparently during 11-00) as a genetic library to store sample seeds including those of rare or endangered plant species. Surely a good idea, and perhaps not before time in view of the panic being provoked in some quarters by GM crop trials. Activists fear these could "pollute" the genetic stock of species other than the subject one, though the news item on the seed storage facility did not attempt to make any connection. Headlines about a modern "Noah's Ark" could have been applied.

(This doubtless refers to the Millennium Seed Bank at Wakehurst Place, Ardingly, Sussex and is operated by Kew Gardens on National Trust property. Visitors cannot visit the underground vaults but the installation as a whole is very worth while visiting because of its superb architecture and well designed informative displays. Editor.)

BATS WERE WELCOMED IN

A letter from Gordon Fergusson, published in the Telegraph 12-8-00, refers to a previous report that Church Commissioners are seeking carte blanche authority for parochial church councils to remove bats from all churches, in apparent contradiction to the legal protection they enjoy in the mines we explore. He says that craftsman Sam Frodsham noted 50 years ago how medieval gargoyles had been designed for Astbury Parish Church to both throw out rainwater away from walls and also serve as apertures allowing bats access into the rafters. Using their ultrasonic hearing, the bats detected and swooped on death watch beetle larvae hatching out from the grain of rafters. Apparently, the apertures here and in other churches were blocked off once heating was later installed, both removing these natural predators and stopping the free flow of air which had prevented dry rot.

Here we see legal protection for bats appears weak in the face of Church Commissioners. In contrast, it hammers the presumed bad intent of "lesser" folks such as those barred (gated) from exploring mines. Eradication of bats from churches would doom them to the poetic retribution of timbers being chewed up by death watch beetles. It seems the Commissioners feel bat droppings are a nuisance.

REUNION AT BUNKER

There was a useful plug for "tourist exhibition centre" Kelvedon Hatch (Essex) bunker on BBC1 breakfast TV 2-11-00. thanks to a gathering of Cold War veterans and their wives marking 40 years. We were told the bunker was built 100ft underground in the 1950's as a nuclear bomb-proof RAF observation centre protecting the skies above London, also serving as Regional Seat of Government for London. It contained supplies for occupants to last up to 6 weeks and equipment which a veteran remarked now looks "pitifully archaic", being preserved since the bunker was decommissioned in 1994.

The news report added two further details of interest. There was enticing reference to the fact that "some active bunkers do still exist in secret locations". Museums like Kelvedon Hatch "struggle to attract visitors" because the Cold War is not significant to many people alive now. They do not feel a threat of nuclear war and fail to appreciate the importance of that time in our history, when the threat was very real and planned for.

This item reminds me of mention made to me in a recent conversation, that a bunker in Bristol has been exposed by redevelopment work. I was not paying special attention so am unsure if it was demolished, under threat, or merely revealed to view by scraping away of surrounding vegetation that had grown up during years of abandonment. I am sure this one was featured on TV in the past, possibly on "Close Up West".

STEEL REBUILDS AT MONKS PARK

Those of you who are not quarry tramway equipment anoraks can skip this one. Creatures covertly creeping around in the bowels of Monks Park and recklessly inhaling radon mentioned in subsequent conversation what seems to be a new development from the traditional type of wagon. Although the same ancient spoked wheels and associated axle boxes are still used, timber frames and cross members have been replaced by rolled steel sections. Instead of having an open top, steel chequer plate floors are fitted, There are also steel uprights at the downward ends only of each wagon. This is presumed to prevent stone blocks falling off when ascending the steep slope shaft. Two such specimens were noticed coupled to the solitary battery locomotive near the foot of the slope shaft during 11-00.

There have been timber framed wagons with uprights at one end, though I tended to assume they were only for carrying muck boxes loaded with small stone, waste or dust (and of course ammunition boxes in times of particular disagreement with our German cousins). A couple of such specimens lingered on for a while on an isolated section of surface track, cut off from access by a new building. That was some long years past.

FIELD HOSPITAL DISCOVERED

This little gem popped up on BBCI TV evening news 25-10-00. It seems that workmen laying a gas pipeline in "a drab Arras street" (northern France) "came upon a flight of stairs going deep underground". At the end was found "a tunnel carved into the chalk" (or stone?) that led to remains of a First World War British army field hospital. We were treated to scenes looking strikingly like the interior of Brownes Folly Bath stone mine at Monkton Farleigh where it was occupied by the military in the Second World War with minimal alterations. References to "caves" and implications of the facility being specially carved out are therefore to be taken with a large pinch of salt.

Archaeologist Alain Jaques said it was amazing to go down 20 metres deep and find this hospital, "just as it was" when abandoned in haste after only 3 days use during 1917 because a German shell burst in the roof. It was equipped to take 700 casualties, just 800 metres from the German front line. Walls still bear both contemporary official military markings and graffiti inscribed by the soldiers. Food tins, shovels and steel helmets are among the debris slowly rotting away in the damp air for 83 years and consequently now very fragile. The reporter commented that horrifying as it undoubtedly was (to the casualties in the hospital), this was infinitely preferable to what was happening in the trenches nearby.

TUNNEL QUARRY DEPOT

This previously less known part of the WW2 "Central Ammunition Depot Corsham" has emerged further into the domain of public awareness with a full page feature in Wiltshire Times 3-11-00. Reporter Heather Skull described a network of underground railways with a station hidden and disused for 40 years, lying 100 feet beneath Corsham's Basil Hill Barracks. Now cared for by Flt Sgt Quinn, the establishment includes 50 acres of "mostly empty" spaces and original Ruston & Hornsby diesel generators now starting to corrode since air conditioning was discontinued. Heather did not mention two smaller Rustons, which are narrow gauge locomotives left over from the construction works and still underground.

One of the 6 historic and present day photographs shows a Hunslet standard gauge diesel loco with sheeted down open wagons beside the entrance to Brunel's Box tunnel. The cab can be seen and was unusually low; these engines were later photographed at "Bicester Depot" having their cabs raised to normal height before being sold on for further use elsewhere. Their gated underground "engine shed" is now bare save for oil drips marking where they stood, a stack of rerailing frogs and a decaying timber hut. It has a central turn table which seems impossibly small but must have fitted these shunters.

Wing Commander Steve Greenwood was quoted saying there is no general public access to the tunnels "because of potential safety problems" as "so much had deteriorated, since the areas had stopped being used, that it would be unsafe to let people in". He added, perhaps for dramatic effect; "There may come a day when it will have to be closed for ever". A picture of a "new communication centre established in 1943 to serve the South West" is the only clue to other presumed security implications which mitigate against public access, even in the present era.

Whilst on this subject, it was mentioned to me that the fascinating painted murals on the walls of the nearby former underground aircraft

engine factory got shown on TV recently. These really are treasures, now accessed through Tunnel Quarry. My favourite, having toddled round for a look a while back, is a family feast scene. Father sits at the head of table ready to carve an enormous roast, all eyes of his children fixed in anticipation whilst an apparently endless queue of waiters recede into the distance. Each bears a large platter loaded with victuals. This was a time of rationing and real hunger. The picture reminds us of how effective the German "U" boat blockade against us was in that phase of the war. The artistry is all the more remarkable for having been executed only in the standard engine production colours, on the whitewashed quarry walls of what was then a canteen area. Scribe also particularly remembers a gambling scene with a policeman approaching (note book at the ready), a wedding story, an Eskimo fishing at an ice-hole, village pub drinking antics, and Missionaries boiling in a large pot over a fire. Walls built in a later period of different use have cut some images in half. Others are degrading as the paint flakes away in the damp air.

MONKTON FARLEIGH DEPOT

A new securing staple (with -00, after it had earlier been noted sawn or ground off leaving the door insecure. Chisel cuts were observed on the new staple by the end of the month, witness to some life form having made a tentative assault, possibly the same one that scratched barely literate legends on the door.

Other industrious "termite activity" was discovered at Farleigh Down Sidings in early 10-00, the steel door of the underground area at the foot of the conveyor shaft being found wrenched open and the central concrete blockage bashed out. No new vandalism was visible anywhere up the 3/4 mile shaft, which still retained some quite complete sections of conveyor (less belt). Explorers can see the haulage motor which divided the run into two sections, remains of the tensioner equipment at the incline bottom, and note the varying spacing between rollers which prevented cases from falling off the belt with vibration whilst moving along it.

A hole had been nibbled centrally through the wall at the top of the conveyor shaft, just big enough to wriggle through. Though another wall blocks progress at 12 District, this hole was "polished" by the passage of persons exploring a nearby area of old quarry used by the military to dump cleared backfill. This boasts some narrow gauge track and steel wagon bodies and seems not to have been accessible when the "Secret City" museum was operating. There appeared to have been mercury spilled on the floor in a switch room near the haulage route, an added vapourous health hazard to thrill the intrepid.

An electric fan on the surface, near Main West building, was sucking air into 12 District (or near there) and at least some of the resulting pressure vented through the aforementioned hole, via the old quarry area. It is just possible the wall may have been pierced for that purpose. Air in the conveyor tunnel to Farleigh Down smelt quite foul and unpleasant, with a sinister mist lingering near the summit wall. An earlier steel barrier lying shattered on the floor bore witness to previous ineffective works meant to keep people out.

FLOOD CONSEQUENCE

Scribe was surely not the only one among us who saw a dramatic news clip from the winter floods that brought such misery to so many, thanks to Global Warming so we are advised. There was this big hole that had opened up in a field, thought to be a forgotten mine working that had collapsed in from the weight of water above. Vast quantities were pouring in but the flooding being so extensive this was not having a significant reducing effect. Perhaps we might hear of this one again if the water subsequently decides to leach out somewhere causing vexations pollution. Dear me, it is enough to make one remove and discard the risible hippo bladders from one's lavatorial cisterns, and enjoy a good old profligate flush!

BOOK REVIEWS

For many years the only book on bunkers was Duncan Campbell's "War Plan UK" but in the last couple of years three books have been published which really open up the subject.

CONTROL CHAIN by Steve Fox

This book traces the history of civil defence in Britain from the birth of the A-bomb, through the response to the H-bomb and then to the stand-down in 1968. Based on over 300 government files from the Public Record Office, many previously classified Top Secret it traces in 25000 words the role and development of the War Rooms, the Sub Regional Controls, the massive Regional Seats of Government and the central government war headquarters.

It also covers the development of civil defence, emergency legislation, etc.

PLAN FOR SURVIVAL by Steve Fox

This book continues the story of civil defence from 1971 to the end of the Cold War. Based on official sources from the Home Office, Emergency Planning College and material prepared for exercises like Hard Rock, Regard and Vireg it concentrates on plans to govern Britain during and after World War III at national and regional levels. Its 41000 words cover the detailed history of civil defence to 1993, the transition to war preparations, plans for central and regional government, the regional bunkers, emergency powers, etc.

Both books are published privately by Steve Fox and can be obtained from him by sending cheques for £7.00 for "Control Chain" and £12.00 for "Plan For Survival" to him at 24 Parkdale, Danbury, Essex CM3 4EH

SECRET UNDERGROUND CITIES by Nick McCamley

Nick literally lives on top of the quarries at Corsham and his lifelong interest in them has resulted in this well researched history of the underground ammunition depots and factories in the Corsham area including the development of Spring Quarry as the Central Government War HQ. He also covers less well-known sites such as Drakelow, Manod and Henley-on-Thames. Available in hardback and paperback, and published by Leo Cooper.

Coal mines around Accrington and Blackburn. Jack NADIN. *British Mining* 64: 160pp. ISBN: 0-901450-51-0. 1999. Northern Mine Research Society, 38 Main Street, Sutton-in-Craven, KEIGHLEY, Yorkshire BD20 7HD. 01535-635388. martgill@legend.co.uk

This entire issue of *British Mining* is devoted to the one paper, *British Mining* 58 on the coal mines of east Lancashire. Two introductory pages are followed by four devoted to the several mining companies which have been active in their area. The bulk of the text (over 140 pages) consists of notes on over 90 individual mines. A national grid reference for each mine is given. The shortest notes are of only a few lines, whereas historical details of some mines extends to several pages. There are 30 figures, including reproduction of Ordnance Survey map extracts, and several plates, many of which show views of surface mine buildings.

There is a short list of sources on page 155, and a five-page index of personal names.

Paul W SOWAN

Researching mining history in the UK. Hazel Mary MARTELL, *British Mining* 63, 147-155. 1999. Northern Mine Research Society, 38 Main Street, Sutton-in-Craven, KEIGHLEY, Yorkshire BD20 7HD. 01535-635388. martgill@legend.co.uk

This paper constitutes a useful beginners overview of how to undertake a mining history research project, from the local public library to the use of the internet, with a reminder of the importance of fieldwork as well.

The Dewey decimal system for book classification in libraries is introduced, including the important message that material on various aspects of mining might reasonably be found under a variety of Dewey numbers. The invaluable inter-library loans service available through public libraries is noticed.

The particular features of local record offices are outlined, followed by a brief discussion of the more specialised UK libraries available for public use.

Finally, there is information on the e-mail mining history discussion list, and on internet sites.

Paul W SOWAN, 29/12/1999

Lake district slate in the mid-18th century. John GOODCHILD. *British Mining* 63, page 163. 1999. Northern Mine Research Society, 38 Main Street, Sutton-in-Craven, KEIGHLEY, Yorkshire BD20 7HD. 01535-635388. martgill@legend.co.uk

This is the text of a mid-18th century letter purchased by and added to the John Goodchild collection at Wakefield. It describes quantities and costs of Westmorland slate supplied for building purposes in Yorkshire. Overland cartage costs and charges by water are also noticed.

Paul W SOWAN 30/12/1999

Introduction to the archaeological surveying of mine sites. Martin ROE. *British Mining* 63, 131-140. 1999. Northern Mine Research Society, 38 Main Street, Sutton-in-Craven, KEIGHLEY, Yorkshire BD20 7HD. 01535-635388. martgill@legend.co.uk

This is a beginners introduction, intended to encourage amateurs to undertake simple surveying of standing structures, earthworks, remains of machinery, and underground features of mine sites. The importance of safety precautions is emphasised.

Tape, and tape-and-compass surveying approaches are described in simple terms. Good advice is offered ... 'never assume that buildings are square!

There is a suggested reading list for those considering attempting mine survey work, whether surface remains or underground.

Paul W SOWAN 29/12/1999

Assessment of early lead working sites in the Yorkshire dales by geophysical prospection.

Kenneth HAMILTON, J.G. McDONNELL and A. SCHMIDT. *British Mining* 63, 156-162. 1999. Northern Mine Research Society, 38 Main Street, Sutton-in-Craven, KEIGHLEY, Yorkshire BD20 7HD. 01535-635388. martgill@legend.co.uk

This paper discusses an assessment of medieval lead-smelting sites in Swaledale, following field-survey with a fluxgate gradiometer.

Yorkshire 'bale' sites are compared with what are termed 'bole' sites, of similar function, in Derbyshire. The Yorkshire sites showed considerable variation, and it is concluded that the terms 'bale' and 'bole' cannot be considered interchangeable.

Paul W SOWAN 29/12/1999

Upper Adit - Cononley lead mine, North Yorkshire.
Martin ROE. British Mining 63, 28-33. 1999. Northern Mine Research Society, 38 Main Street, Sutton-in-Craven, KEIGHLEY, Yorkshire B020 7HD. 01535-635388. martgill-legend.co.uk

This paper presents the results and interpretation of survey work at an adit at SD 979462 thought to have been opened in the 1820s. Details are given of the now-accessible extent of the adit, a side-branch, and a rise worked to test what turned out to be an unmineralised vein. Rails and a wooden launder are noted. Surface features outside the adit are also described, including a multi-lobed spoil tip containing principally shale, gritstone, and barytes, and a flat area interpreted as a possible preliminary hand-worked dressing-floor.

The site is interpreted as demonstrating two phases, ore being extracted from this adit until 1848, whilst thereafter it served only as a means of escape for minewater.

There are several illustrations, including plans of surface and underground features.

Paul W SOWAN 29/12/1999

Cononley: the anatomy of a mining village.

Michael C. GILL. British Mining 63, 34-47. 1999. Northern Mine Research Society, 38 Main Street, Sutton-in-Craven, KEIGHLEY, Yorkshire B020 7HD. 01535-635388. martgill-legend.co.uk

This paper draws on census, muster roll, parish register and other evidence to examine the population of Cononley in Yorkshire. Although predominantly concerned with farming and textiles, the village saw some lead mining in the 18th century and more intensive mining and smelting between 1840 and 1872. The origins of incoming lead miners are discussed.

Paul W SOWAN 29/12/1999

Company formation in the 19th century slate industry.
Andy BOWMAN British Mining 63, 48-55. 1999. Northern Mine Research Society, 38 Main Street, Sutton-in-Craven, KEIGHLEY, Yorkshire BD20 7HD 01535-635388. martgill@legend.co.uk

This paper examines company formation in the slate industry in Devon during the second half of the 19th century, with particular reference to the Limited Liability Act, 1856. Information on a number of Devon slate companies is presented. Source material used includes companies' annual returns to the Registrar of Companies, company prospectuses, local newspapers, the Mining Journal, directories, etc.

Paul W SOWAN 29/12/1999

The Rowley Hall colliery, Rowley Regis, Staffs.
Nigel CHAPMAN. British Mining 63, 64-73. 1999. Northern Mine Research Society, 38 Main Street, Sutton-in-Craven, KEIGHLEY, Yorkshire BD20 7HD 01535-635388 martgill@legend.co.uk

This paper draws on colliery leases and information from the *Colliery Guardian* and the *Mining Journal* to present an account of the working of coal from coal measures intruded by a basalt dyke at Oldbury. Four collieries were operating in the area by 1835. The mine particularly described was commenced as a result of a lease of 1865 permitting extraction of coal, ironstone, and basalt (used for roadmaking.) Two shafts were sunk to a depth of 230 yards between 1865-67.

The mining methods, including longwall work and the Staffordshire squarework system, are described in some detail, with illustrative diagrams and a sketch plan of the mine. Mining was continued through the basalt dyke to extract some coal on the far side.

Details statistics for the output of coal, slack, and fine coal for 1897-98 are given.

Paul W, Sowan 29.12.1999

Recent explorations in Scaleburn vein (Nenthead), Alston Moor, Cumbria.

John LAWSON, British Mining 63, 74— 103. 1999. Northern Mine Research Society, 38 Main Street, Sutton-in-Craven, KEIGHLEY, Yorkshire BD20 7HD. 01535-635388. martgill@legend.co.uk

This paper describes in some detail the exploration, including digging through fallen rock, of the Scaleburn mine. What is claimed to be the only known surviving underground horse whim in the country is reported. Although there is scope for further exploration, it is possible that low oxygen levels in the mine air may prevent further progress. Several mine plans are presented.

An outline history of the mine, worked for lead and zinc, is presented, from a London Lead Company lease of c. 1756, through to the 1920s. The earliest known mine plan is dated 1773.

Profit and loss accounts for the period 1791-1808 are given.

Paul W SOWAN: 29/12/1999

Tragedy at Bethnal Green. Report on an inquiry into the accident at Bethnal Green tube station shelter.

L.R. DUNNE. The Stationery Office: Uncovered Editions: (viii) + 80 + (iv)pp ISBN 0-1 1-702404-X 1999 £ 6.99 from tSO Publishing [The Stationery Office shop, Kingsway, London].

The accident at the Bethnal Green tube station air-raid shelter happened on 3rd March 1943. As a result of panic concerning expected imminent air raids, large numbers of persons attempted to enter the underground shelter at Bethnal Green. Two or three persons fell at the bottom of the first flight of steps, resulting in an immense pile of bodies fallen and crushed to death as a result of the large crowd pressing down the staircase behind them. A total of 173 persons died (27 men, 84 women, and 62 children.) For two days the Government withheld information about the tragedy in order to prevent word reaching the enemy. Eventually, an inquiry was held in secret, the results of which were not published until 1945, after the war had ended. This pocket-sized edition is a reprint of the report, with illustrations.

Paul W SOWAN 24.12.1999

The Alliance Mining Association and Great Roughtor mine, Sheepstor Tom GREEVES. Newsletter Yelverton & District Local History Society 16, 11-13. 1999. £ 2.20 incl. p/p from Peter Laxton, Yelverton & District Local History Society, 4 The Coach House, Grenofen, TAVISTOCK, Devon PL19 9ES

This note presents historical data and field observations concerning a tin-mining site in south-western Dartmoor, about 5 kilometres east of Yelverton. Documentation from as early as 1611 is reported, with the last known activity at the site in 1847.

Visits from 1969 onwards led to the recording of a building, spoil tip, leats, shafts, and adits, all in SX 5768. Six sites (the building and five adits) have been incorporated into the Devon Committee for Rescue Archaeology's 'Survey of archaeological sites within the afforested part of the Burrator Catchment.' A possible outlying prospect adit is at SX 56456882. The hope is expressed that South West Water and the Dartmoor National Park Authority will soon take steps to protect the features.

Paul W. Sowan 13.11.1999

The Victoria tunnel in Newcastle-upon-Tyne.

Alexander CHAMBERLAIN Industrial Heritage 17(3), 6-9 1999. £ 2.50 + p/p from The Book House, Ravenstonedale, nr. KIRKBY STEPHEN, Cumbria CA 17 4NQ 015396-23634 (T) 15396-23434 (FAX) mail@thebookhouse.co.uk

The Victoria tunnel was made between 27th June 1839 and 8th January 1842 for a tramway to convey coal from mines, which had operated at Town Moor since about 1835, to the Tyne. Previously to the making of the tunnel, the coal had had to be carted through the city streets. The formal opening was on 7th April 1842. The tunnel is 2.5 miles long, and in that distance descends 222 feet. It is driven in clay.

There was a stationary engine, and the waggons were rope-hauled. The colliery closed in 1860, and the tunnel was disused until in 1939 the need for deep air-raid shelters in the City arose. Converted for this purpose at a cost of £ 37,000 it accommodated 9,000 persons. Additional entrances were made, although after the war most of these were blocked again. In 1976 some 800 metres of the tunnel were used to accommodate a sewer, saving some £ 100,000 in new excavation costs. There are current plans to open a part of the tunnel to visitors at the lower (Tyne) end.

The paper is illustrated with a photograph of the tunnel interior, and a sketch-map relating the course of the tunnel to the City street plan. There is a full and detailed list of sources, and a bibliography.

Paul W. Sowan 31.10.99

Maesteg railway tunnel (The explosion of 1876.)

Clive SMITH. Port Talbot Historical Society: 25pp. 1998. £ 2.50 {By post

£ 3.00 from Port Talbot Historical Society, 109A Penycae Road, PORT TALBOT, West Glamorgan SA13 2EG}

This work deals, in some detail, with the construction of the 1,594 yd Maesteg (otherwise Cymmer or Cymmer-Caerau) tunnel which was made during 1875-77 below Y Foel Fawr (1,147 feet) and the disastrous accidental dynamite explosion inside the tunnel on 21st April 1876 which resulted in 13 deaths and two injuries.

The tunnel, now disused, lies on the northern extension of the Llynvi and Ogmore Railway (Act 1873), between the former Cymmer and Caerau stations, and established railway communication between the Afan and Llynfi valleys.

The single bore tunnel was straight throughout, on a uniform gradient of 1 in 226 towards the south (Caerau.). In view of the height of Y Foel Fawr above it, it was driven from the two ends only, with no intermediate working shafts. Mechanised drilling was used in the northern (Cymmer) bore, as was the then new dynamite. The two bores, 957 yards from the northern end and 637 yards from the southern, met on 29th May 1877, and the tunnel and new line were opened for traffic on 1st July 1878. Although originally intended to be lined with local stone, brick from Richard Jenkins' brickworks near the Caerau end of the tunnel was actually used on grounds of cost. The overall cost of driving the tunnel was £47,422 (or £29 15s 0d per yard.)

On 21st April 1876 about 150 lbs of dynamite, kept in a manhole within the Cymmer drive of the then unfinished tunnel, exploded. Thirteen men or boys in the immediate vicinity were killed outright, and two more seriously injured. Massive beams, and masonry, were projected out of the tunnel mouth with great violence. However, workmen who had been between the dynamite store (176 yards in from the tunnel mouth) and the working face were unharmed.

The tunnel continued in use until the closure of the last remaining colliery in the Upper Afan valley, at Glynccorwg, in May 1970. Some passenger and specifically school trains continued to run until 15th July 1970, the official closure date for the line.

The northern portal is now back-filled, landscaped, and lost under a road-widening scheme. The south portal remains accessible.

The author has relied particularly for source material on G.F. Adams' paper on 'The Maesteg tunnel' in *Trans. South Wales Institute of Civil Engineers* 10(6) (1877), and on local newspapers of the period. This is a carefully researched and well-produced booklet, recommended to all interested in tunnelling technology and in industrial accidents with explosives. The text is accompanied by maps, sections, and photographs

Paul W SOWAN 08/07/1999

Cleveland ironstone walks: east Cleveland ridge. Five walks visiting the old ironstone mines of Cleveland. Simon BLAKE. Guisborough: Peter Tuffs: 4Spp. 1999. £ 3.50 + p/p extra from Embsay Steam Railway Trading Co. Ltd., Embsay Station, SKIPTON, North Yorkshire BD23 6QX

This booklet, in Peter Tuffs' 'Industrial archaeology of Cleveland' series, describes (with practical details) a series of walks visiting ironstone mining sites and relics of the former Cleveland Railway inland and to the south of Saltburn. The railway opened c. 1862, and closed c. 1960 apart from its northern end which is still in use for freight traffic. The first ironstone mines were sunk c. 1864, and the last closed during the 1960s. The unfinished earthworks of the abandoned Cleveland Extension Railway, and relics of alum-shale working, brickworks, roadstone quarries, etc, are noticed. Remaining buildings associated with the ironstone mines, including workers' housing, are described, with historical detail supplied.

Paul W SOWAN 08/07/1999

Fortress Europe. European fortifications of World War II.

J.E. KAUFMANN and Robert M. JURG: London: Greenhill Books. 431 pages. 1-85367-341-2. 1999. £ 30

This work uses previously unavailable east European archives to present a 'general overview' of fortifications, many of them with underground elements, either constructed during the Second World War, or constructed previously and having a defensive role in that war.

The entries are arranged geographically, with chapters for France, Germany, Belgium, the Netherlands, Switzerland, Great Britain (including Gibraltar and Malta), Italy, Scandinavia, Czechoslovakia, Poland, Yugoslavia, the Balkans (Greece, Rumania, and Turkey), Finland, the Soviet Union, and the Atlantic Wall, with an appendix on the Iberian peninsula. Hungary is not included, as no information was to hand in time for publication. It is noted that Switzerland, alone, keeps its fortifications on the 'active' list and still 'top secret', although the country does have 15 pages to itself in the book.

There are small-scale location maps for the countries described, although more detailed maps will be needed by the reader for locating particular works. There are photographs and plans of a number of the works described.

The main text is supplemented by for pages of notes, four pages of suggestions for further reading, a five-page bibliography and listing of all sources used, a three-page glossary, and an index.

Paul W SOWAN 03/12/1999

L'ancienne mine de Cap Garonne (Var.)

ANON. Bulletin d'Information Trimestriel Groupe de Recherche Souterraines en Milieu Artificiel 32, 36-48 1998. Groupe de Recherches Souterraines en Milieu Artificiel. Siege Social, 15 Square Van Lindt, 1160 BRUXELLES, Belgium

This article describes a copper mine now operated as a tourist attraction at Le Pradet (Toulon), southern France. The mine was worked between 1857 and 1917, one M. Unwin (English) holding the concession from 1873 to 1884. Mineralisation by azurite, malachite, etc is reported. The country rock is a mineralised basal conglomerate of Triassic sandstone, overlying red Permian sandstone.

Plans of the mineralised area, showing the extent of mining, are reproduced for 1884, 1900, 1906, and 1917 when the mine ceased production. It was reopened for mushroom culture in 1946.

In 1994 it opened as a subterranean museum of copper mining. A 1985 plan indicates the current extent of the workings, parts of which accommodate the museum. Museum contact details are given.

Paul W SOWAN 28/11/1999

Un petit site minier peu connu et son environnement.

Francis POLROT. Les Hayettes (Bilstain, Limbourg, province de Liege.) Bulletin d'Information Trimestriel Groupe de Recherches Souterraines en Milieu Artificiel 32, 3-17. 1998

Groupe de Recherches Souterraines en Milieu Artificiel. Siege Social, 15 Square Van Lindt, 1160 BRUXELLES, Belgium

Bilstain is six kilometres SW of Welkenraedt, in Belgium. The article describes (from archival material) a small-scale mining operation, not much more than a trial, in which limonite, calamine, smithsonite, and some galena are reported. The country rock is dolomites, limestone, and shales of Carboniferous age. Limonite appears to have been worked commercially in some years between 1846 and 1865.

A sketch plan and section of the very limited underground workings is given, from surviving documentation, and plans and photographs and a description of the surface site and remains today.

Paul W SOWAN 28/11/1999

The construction of Lydgate tunnel.

Jeffrey WELLS Bull. Saddleworth Historical Society 28(2), 1-6. 1998. Elsie Broadbent, Saddleworth Historical Society, 30 Beechfield, GRASSCROFT, Saddleworth, OLDHAM OL4 4EL

This article is based largely on a longer and more technical paper by James Grant Fraser in the *Minutes of Proceedings of the Institution of Civil Engineers* 22 (1862/63), 372-377.

The construction of the 1,332 yard Lydgate tunnel (now disused) on the closed Oldham branch of the London and North Western Railway is described, between Greenfield and Oldham.

The tunnel was driven through Coal Measures, comprising a wide range of rock-types and ground conditions, between 1854 and 1856, and excavated via five construction shafts. Additionally, a redundant coal mine shaft was employed for spoil extraction!

A longitudinal section drawing is included, incorporating geological details, and tunnel cross-sections.

Rates of progress and costs are cited.

Paul W SOWAN 28/11/1999

Ashfordby colliery closes. **Tony BUCK.** Mercian Geologist 14(3), 102-103. 1998. From The Secretary, East Midlands Geological Society, Rose Cottage, Chapel Lane, EPPERSTONE, Notts NG14 6AE 0115-966-3854

Records the closure, announced 18th August 1997, of the Ashfordby deep coal mine near Melton Mowbray, Leicestershire, with notes on geological problems which precipitated abandonment of equipment and closure of the mine. The text is accompanied by a photograph taken by Tony Waltham of the demolition of the two winding towers on 28th March 1998. Paul W SOWAN 30/05/2000

Tunnel lining at Rio Tinto: methods used at Las Minas de Rio Tinto, in Spain, 1954. **A.A.C. BREWIS** Mining Histor 14(2), 41-44. 1999. M.J. Luff, Peak District Mines Historical Society Ltd., The Coppins, Wash Lane, Ravenstone, Leicestershire LE7 2AZ. 01530-810905. Web site PDMHS on <http://info.exeter.ac.uk/Rburt/MinHisNet>

The author, having graduated with a degree in mining engineering in 1952, was employed in connection with military tunneling at Gibraltar during the 1950s, and describes observations made during a period of leave at the Rio Tinto mines. The report presented here was originally written for the military authorities at Gibraltar.

The geological context for rail access tunnels is described, as is the method used to construct the tunnel-linings, with diagrammatic illustrations.

References to published materials on mining at Rio Tinto are given.

Paul W SOWAN 29/05/2000

Horsebuttock, Shack, Little, Drake and Pitts mines, **Winster. D. PENNEY and E.M. DIXON.** Mining History 14(2), 45-56. 1999. From M.J. Luff, Peak District Mines Historical Society Ltd., The Coppins, Wash Lane, Ravenstone, Leicestershire LE7 2AZ 01530-810905 Web site PDMHS on <http://info.exeter.ac.uk/RburtMinHisNet>

The authors report on underground exploration and surveying in lead mines to the east of Winster in Derbyshire between 1989 and 1998. The article is illustrated by maps, plans, sections, and photographs of underground scenes.

The recorded 18th century history of the mines is summarised, and details of leather and textile fragments found in the Shack / Drake vein.

Paul W SOWAN 29/05/2000

Jack Beck and Masson Hill: a tribute to a man and a mountain. **Neville GREGORY** Mining History 14(2), 59- 63.. 1999. From M.J. Luff, Peak District Mines Historical Society Ltd., The Coppins, Wash Lane, Ravenstone, Leicestershire LE7 2AZ 01530-810905 Web site PDMHS on <http://info.exeter.ac.uk/Rburt/MinHisNet>

This article contains the author's recollections of mineral exploitation on Masson Hill, near Matlock, Derbyshire. With the assistance of two sketch-maps, the progress of fluorspar mining and opencast limestone quarrying is traced from about 1920 onwards. The development of limestone working is presented in particular detail, in relation to the development of ICI's operations at Tunstead, the Second World War, and post-war Town and Country Planning legislation.

Paul W. SOWAN 30/05/2000

Below the Temple Mount in Jerusalem. A sourcebook on the cisterns, subterranean chambers and conduits of the Haram al-Sharif. **Shimon GIBSON and David M. JACOBSON.** British Archaeological Reports International Series 637: xxv + 301pp. 1996. ISBN: 0 86054 820 1. £40 from Oxbow Books, Parkend Place. OXFORD

This volume reviews the chronology of the Temple Mount from c. 1200 BC to present, and published and hitherto unpublished material relating to cisterns and conduits excavated below it. Almost 50 rock-cut cisterns are catalogued, from well-recorded structures for which plans and sections and location plans are given, to others thought to exist but which concerning which little is recorded. Conduits and passageways within the rock are similarly catalogued. The Jerusalem cisterns are then considered in the wider context of water management in the Middle East from the 3rd millennium B.C. 'Solomon's stables' and the cave of the Sakhra are also described, the former being a vaulted space supported by columns below a raised area level with the top of the mount. Reproductions of old illustrations and field sketches are included. There is a very full list of all sources used in compiling the work.

Paul W. Sowan 14/07/1999

The Minions Moor: a guide to south-east Bodmin Moor, Cornwall. 2nd edn.. Peter STANIER. St. Ives Printing & Publishing Company: i2Opp ISBN 0-948385-29-4. 1996 £ 5.50 + p/p from St. Ives Printing & Publishing Co., High Street, St. Ives, Cornwall.

This is a revised and enlarged second edition of a work first published in 1986. Essentially a guide for interested walkers, the book contains information on granite quarries, tin and copper mines and associated buildings remains, and associated railway lines, archaeological monuments, water supply and water power, etc.

There are numerous line illustrations, sketch maps, and photographs. One and a half pages are devoted to a list for further reading, and there is an index occupying two pages.

Paul W SOWAN 12/11/2000

Tin soldiers go marching on. An ancient Cornish industry is kept alive by one family.

Martin JACKSON. The Times 19th February 2000, page 17. 2000

This is an illustrated feature article describing a small tin-streaming and smelting operation by Cohn and Mark Wills at Trevellas Coombe, near St. Agnes, Cornwall. The family is of tin-mining origins, and the operation is worked as a 'heritage site' and tourist attraction, the smelted metal being sold for jewellery / ornamental purposes. Ruins of mine buildings survive nearby. The 'Blue Hills Tin Streams' have attracted 4,000 visitors per annum. Visitors are shown the geology, industrial archaeology, streaming and smelting processes.

Paul W SOWAN 29/02/2000

The Burnley coalfield: some geological influences upon the former mining exploitation and present-day development. Iain A. WILLIAMSON. British Mining 63, 5 -27.. 1999. Northern Mine Research Society, 38 Main Street, Sutton-in-Craven, KEIGHLEY, Yorkshire BD207HD 01535-635388 martgill~legend.co.uk

Coal-mining in the Burnley coalfield is known to have been commenced by the late 13th century, and had almost ceased by 1982, the only known unworked reserves having an unacceptably high sulphur content. This paper considers the 19 Lower Coal Measures seams worked in the field, and presents an account of their nomenclature, synonyms, etc. Seams mined were relatively thin (averaging 1.5 metres) and often at shallow depth, resulting in problems of water ingress and surface stability. Other geological factors considered include sedimentological features (including split seams, partings, and washouts); structural features; and the high rank of the coal which resulted in significant gas emission and dusty workings (with associated fire and explosion risks.)

A geological sketch-map is included, showing the locations of 26 named collieries. Some 640 shafts and drift entrances are noted to exist, although the determination of exact locations for many of these is problematical.

The paper contains an interesting discussion of the effects of geological conditions on coal-mining in the light of what is known of 17th century lead mining in the same area.

It is noted that briefly, during 1945, iron pyrites was won from the coal seams for sulphuric acid manufacture.

Paul W SOWAN 29/12/1999

ROF Thorp Arch. Part One - World War Two.

Mike CHRISTENSEN Archive 22, 14 - 30. 1999. £ 6.00 from Lightmoor Press, 47 - 49 High Street, LYDNEY, Gloucestershire GL15 5DD

This article reviews the expansion of munitions filling factory capacity during the period 1930 - 1940, and describes the planning and building of Royal Ordnance Factory No. 8, at Thorp Arch, near Boston Spa, Yorkshire. The site was rail-linked at Thorp Arch station, on the LNER line between Tadcaster and Harrogate, and the factory, built 1940 - 42, had its own circular railway track, four internal 'stations, and numerous sidings to individual factory buildings. Some 20 such factories in all were erected in connection with WWII.

The layout of the complex is described, and explained in terms of the various operations carried out in connection with assembling munitions - parts and explosives having been manufactured elsewhere. Of the 20 photographs, about half show external views of buildings, and half are of internal views, plant and personnel. A plan showing the layout of the site and its railways is included.

Details are given of the factory's output, including cartridges, shells, mines, bombs, small arms ammunition, detonators, grenades, etc.

Paul W SOWAN 10/06/1999

De Prehistorische vuursteenmijnen van Ryckholt-St.

Geertruid. Rademakers (editor). Maastricht: Nederlandse Geologische Vereniging (afd. Limburg). Paperback (iv) + 333pp + loosely inserted coloured plan of mine workings. ISBN 90-801523-4-X. 1998. Hfl. (Guilders) 35 inclusive of postage from Penningmeester NGV (afd. Limburg), Molenberg 10, NL-6 191 KM BEEK, The Netherlands. Also from the Natural History Museum, Maastricht.

This substantial volume is published by the Dutch Geological Society's Limburg Section to celebrate its 30th anniversary. It is devoted to the geology and archaeology of the world-famous prehistoric flint-mines site at the paired villages Ryckholt and St. Geertruid, on the right (east) bank of the river Maas, some six kilometres south of Maastricht.

The site was first recognised in 1881, and the volume summarises the results of excavations and researches from then until 1964. From 1964 to 1972 the mines were excavated and recorded exhaustively in a novel way. Instead of excavating one or two individual shafts and the low mine galleries leading from them, a 10 to 20 metre wide 150 metre long sample was examined by driving a tunnel right through the mining field at mine-gallery level. The considerable assistance of mining engineers from the (now defunct) Dutch coal mines, which were not far away in Zuid Limburg, was an essential part of the project. The 'sample' tunnel intersected mine galleries associated with 80 infilled vertical mine shafts.

The geology and archaeology of the sampled mines are reported in detail. Although the text is exclusively in Dutch, the work is exceptionally well provided with diagrams, plans, sections, tables, and black-and-white and coloured photographs. A coloured detailed plan of the sampled area, showing shafts, galleries, solution-features in the Maastrichtian chalk, etc, at a scale of 1:400 is loosely inserted. Seventeen pages are devoted to a detailed bibliography of relevant published work on flint-mine archaeology and related topics.

The tunnel, now maintained as a concrete structure from which the mine galleries can be viewed through windows left for the purpose (electric lighting is provided within both tunnel and galleries), can be visited by interested parties by arrangement with the Dutch Forestry Service, in which body's land it lies. It is not generally open to the public, as it is in a rural area reached only by footpaths from the public road at Ryckholt.

Paul W SOWAN 08/10/1999

Model specification for tunneling.

British Tunnelling Society. Thomas Telford Publishing: (ix) + 140pp 1997. ISBN:0-7277-2588-2. £ 35.00 from Thomas Telford Ltd, Thonias Telford House, 1 Heron Quay, LONDON E14 4JD

Whilst the primary purpose of this document is to save engineers' and contractors' time in drawing up specifications and contracts for tunnel construction, it is also of interest to anyone interested in tunnelling history. Detailed specifications for materials and methods are laid down, and doubtless reflect experience with tunnelling in the past.

References are included to all current tunnelling methods, with cross-references to relevant British Standards and legislation.

Paul W SOWAN 27/07/1999

Abandoned stations on London's Underground: a photographic record. Connor & Butler Ltd: 96pp.

J.E. CONNOR. ISBN: 0-947-69930=9. 2000. : £ 12.95 from London Transport Museum or from Connor & Butler Ltd., 69 Guildford Road, COLCHESTER, Essex

This book is a companion to the same author's '*London's disused underground stations*' and is in effect a pictorial supplement (very few of the photographs in the earlier volume have been used again in this one.) Some lines and stations beyond the Greater London boundary are included, and altogether over 50 stations are described, both surface and subterranean.

The author has included stations which have been closed or relocated, but not those rebuilt at the same location as their predecessors.

An interesting short section deals with railway projects which were abandoned before completion.

Contemporary maps issued by the operating companies are a useful additional feature, and basic historical detail is provided.

Paul W SOWAN 25/02/2000

The London Underground: a diagrammatic history. 7th edn.

Douglas ROSE Author: large folded paper map in card covers. ISBN: 1-85414-219-4. 1999. £7.95 distributed by Capital Transport Publishing, 38 Long Elmes, HARROW WEALD, Middlesex HA3 5JL. Or from London Transport Museum

This deservedly popular and very clearly presented folded map, first published in 1980, has now reached a seventh edition, which encouragingly has been needed as a result of significant line and station openings rather than and outnumbering closures.

As in previous editions, the map does not indicate which parts of which lines are underground, either 'cut-and-cover' or 'deep tube', which would be a relatively simple addition of some historical and geographical interest.

Nor does it show the actual number of tracks or tunnels at any particular point, or 'operational' lengths of line or tunnel not traversed by passenger-carrying services, the addition of which detail would of course make the map very much more complex. Such detail is shown by the relevant part of the Quail Map Company's productions. And exactly where, in relation to the surface of London, all the tunnels (in use and abandoned) run remains, perhaps quite sensibly, almost a state secret!

Paul W SOWAN 25/02/2000

Tunnels.

Alan MYERS, John BARTLETT, Denis LAWRENSEN, Ken INNES and Colin MacKENZIE.

New Civil Engineer, 20th Century Civil Engineering Supplement, November 1999, 40-44. 1999. New Civil Engineer, 151 Rosebery Avenue, LONDON EC1R 4GB

This illustrated feature incorporates short articles on the Channel Tunnel's UK crossover chamber, bentonite-assisted TBM tunnelling trials at New Cross, the second Mersey road tunnel, the Hong Kong cross-harbour tunnel, and the Thames Water Ring Main.

Paul W SOWAN 06/03/2000

Miners and farmers: the agricultural holdings of the lead miners at Heights, Gunnerside, in North Yorkshire.

Timothy B. BAGENAL. British Mining 62: 53pp. ISBN 0-901450-50-2 1999. Northern Mine Research Society, 38 Main Street, Sutton-in-Craven, KEIGHLEY, North Yorkshire, BD20 7HD

Presents a study of the agricultural holdings of lead miners in North Yorkshire in the mid-nineteenth century, using valuation, census, tithe apportionment, manor court, land tax and wills documents. Includes photographs and plans of buildings and a sketch plan of Melbecks Moor.

Paul W SOWAN 02/10/1999

ASSOCIATION for INDUSTRIAL ARCHAEOLOGY - NATIONAL ASSOCIATION of MINING HISTORY ORGANISATIONS - RAILWAY and CANAL HISTORICAL SOCIETY - SUBTERRANEA BRITANNICA - NEWCOMEN SOCIETY - BIBLIOGRAPHY

Author: Mike OSBORNE

Title: 20th century defences in Britain: Lincolnshire

Publication details: London: Brasseys / Defence of Britain Project: xii + 84pp

Published: 1997

ISBN: 1 85753 267 8

Availability: £ 6.99

Abstract:

This is a useful and fully-illustrated guide to 20th century military and defensive works in Lincolnshire, categorised as airfields, anti-invasion defences, railway guns, anti-aircraft defences, sea defences, and wartime industrial installations. It will be of interest to persons wishing to visit such structures, and will assist with the identification and interpretation of enigmatic concrete structures. In addition to the obviously military structures and buildings, there are details of, for example, water towers; a map of railways showing armoured train routes is provided. Underground sites are barely noticed, other than Royal Observer Corps posts. The coverage is predominantly of World War II structures.

The Reigate Stone Research Project.

Paul W. SOWAN. Down to Earth 28, 4-5. 1999. Geo Supplies Ltd., 16 Station Road, Chapelton, SHEFFIELD S35 2XH 0114-245-5746

Describes the origin of the project in the Historic Royal Palaces Agency's concern over deterioration of building-stone at Hampton Court and the Tower of London. The underground quarries from which the stone was extracted are described, as is the geological context of the building-stone beds. HRP seek samples of the building-stone for testing stone conservation treatments, but distinguishing potentially good building-stone from the intercalated beds of inferior stone appears to be lost quarrymen's knowledge. The research programme, of which Stage 1 has now been completed. Stage 1 involved taking drilled core samples to examine the stratigraphy and lithology and four underground locations within the quarries. Stage 2 has commenced, with the examination of samples by microscope study of thin sections, scanning electron microscope photography, chemical analysis, and other tests.

Paul W SOWAN 18/08/1999

Speech House Hill colliery.

Ian POPE. Publication details: Archive 22, 2-13. 1999. Availability: £ 6.00 from Lightmoor Press, 47 - 49 High Street, LYDNEY, Gloucestershire GL15 5DD

Describes a coal mine in the Forest of Dean (Gloucestershire) commenced in 1832. A site plan, including railway connections, and a geological section are provided. Eleven photographs of the mine at work in the latter years of the 19th century are included, showing pit headgear, surface buildings, railways and waggons, and two underground views.

By 1906 the underground working had linked with those of the Lightmoor colliery, from which point onwards all coal was extracted via Lightmoor. The shaft and winding equipment were however retained for a while at Speech House as an emergency escape route and for ventilation.

Paul W SOWAN 10/06/1999

Coal hunting at Bexhill 1805 - 1811: how the new science of stratigraphy was ignored. Hugh S. TORRENS. Sussex Archaeological Collections 136, 177- 191. 199. Sussex Archaeological Society, The Barbican, LEWES, Sussex

This paper describes the abortive attempts to find economically useful coal, rather than thin lignite seams, at Bexhill in East Sussex between 1805 and 1811, in the hope of reviving the Wealden iron industry. The chief promoter was William James (1771-1837.) John Farey (1766-1826) argued otherwise, from his understanding of stratigraphy learned as a result of field observations with William Smith (1769-1839.) Farey realised that the beds at Bexhill were stratigraphically many thousands of feet too high in the geological succession to bear true coal of Carboniferous age, but his advice was ignored. The project failed, at a total cost of over £ 30,000.

Paul W SOWAN 12/08/1999

Zabytkowa Kopalnia Soli w Bochni / Ancient salt mine in Bochnia.

Robert KUROWSKI. Bochnia: Kopalnia Soli Bochnia: 37pp. ISBN: 83-904427-0-1 paperback.1995. Zi 12 from Kopalnia Soli Bochnia, BOCHNIA, Poland.

Less well-known than the nearby Wieliczka salt mine, that at Bochnia is a more rewarding visit if you are more interested in salt-mining than in standard tourist-guide tales of gnomes and folk-lore and salt carvings and underground chapels.

The Bochnia salt mine, in the town centre, ceased production some years ago, although the Polish Government continues to employ 290 miners to retain the uppermost levels in good condition, as an important industrial monument and as a tourist attraction. An additional staff of 30 operates the guided tours, and the administers the underground sanatorium where it is possible to stay underground for an extended period for health purposes.

This well-produced colour-printed guide is in English and Polish, includes coloured historical prints of the town, and colour photographs of scenes of mining interest underground, including one of a spectacular 'stope' in a steeply dipping salt vein and others of extensive timber support-work. Rollingstock and enormous wooden winding-gins are also portrayed. Some interesting historical mine sections are reproduced. And, of course, there are photographs of the underground chapel and of the figures in it carved in solid rock salt.

There is no geological section in the booklet, regrettably, but there is a sketch map locating the three shafts (only the one in the town is used for public access) and thus giving some idea of the extent of the mine workings in relation to the town above them.

Paul W SO WAN 08/10/1999

The Garleton haematite mine.

Bill BAIRD. Bull. Grampian Speleological Group 5(3), 13-17. 2000.. [Reprinted from East Mid Lothian Life, Autumn 1999] Available at £2.00 from The Grampian Speleological Group, 8 Scone Hardens, EDINBURGH EH8 7DQ. 0131-661-1123. www.sat.dundee.ac.uk/~arb/gsg/ E-mail Goon90@hotmail.com

This article describes a short lived 19th haematite mine at Garleton about two miles NW of Haddington, East Lothian. Mining commenced in the 1860s yielding 100,283 tons of 'high quality ore' in 1874, but ceased about 1876. Historical and geological details are given from which it appears that the ore reserves diminished with depth and were soon worked out. Three small photographs taken in 1965, when the workings were partially flooded are reproduced (one of the entrance, and two underground,)

The article is accompanied by a mine plan and section (dated 1873 and 1876) reproduced by permission of the Geological Survey. Three shafts are indicated with about two thirds of the depth of workings flooded.

Paul W. SOWAN 19/06/2000

The Kirkleatham Iron Stone Company.

TUFFS and Neil PARKHOUSE. Archive 22, 31-44. 1999: £ 6.00 from Lightmoor Press, 47 - 49 High Street, LYDNEY, Gloucestershire GL 15 5DD

The ironstone mine described was actively at work during the period 1873-1887, near Redcar (Cleveland.) There was a five-mile railway, including embankments, cuttings, and inclines, from the coast. The mine was commenced, following exploratory boreholes and drifts, as a result of iron mining having been successfully undertaken at other locations in the neighbourhood. Shafts were sunk to depths of from 90 to 150 feet or so, and the seam exploited until all winnable reserves had been exhausted.

There are two old Ordnance Survey map extracts. The photographs show the mine buildings, railways and a locomotive and waggons on the lines and at the incline bank top, and the overgrown drift entrance which is all that now remains at the site. There is a summary table of details of the Kirkleatham locomotives.

Paul W SOWAN 10/06/1999

The industrial archaeology and industrial history of south western England. A bibliography.

John GREENWOOD. Cardiff: Merton Priory Press: xii + 253pp. 1999. ISBN 1 898937 28 1. £30 + p/p from Merton Priory Press Ltd, 67 Merthyr Road, Whitchurch, CARDIFF CF14 1DD

This fifth and final volume in the author's series of bibliographies for England deals with (mainly) printed and published works concerning Bristol, Cornwall, Devon, Dorset, Gloucestershire, Somerset and Wiltshire. Government publications and newspapers are excluded. Items relating to industrial accidents and industrial relations are excluded. Some unpublished materials, such as higher degree theses, are included (with an indication of where these can be consulted.)

Details are given of earlier published bibliographies consulted, and of periodicals cited. The list of periodicals, however, should not be taken to mean that every issue has been searched, as clearly this is not in fact the case- much of interest in the *Proceedings of the Geologists' Association* or in the *Railway Magazine* or in *Quarry* (and successor titles) has been missed.

The emphasis seems to be on materials written as historical or archaeological studies, rather than on contemporary descriptions of operating concerns, although this is not exclusively the case.

There are entries for 3,888 items with (unlike some earlier volumes in the series) seemingly a reasonable balance between subject areas, although some important topics are conspicuous by their absence. One looks in vain for mention of work on the historically important Beer quarries in Devon, Chilmark quarries in Wiltshire, or Nailsworth quarries in Gloucestershire. Or for recognition of the ball clay workings in Dorset (although those in Devon have entries.) There are disappointingly few entries for quarries in Gloucestershire. If an ammunition depot in Gloucestershire is worth including, one wonders why the enormous underground ammunition depots in the Box and Corsham quarries are not noticed.

Nevertheless, this is a valuable work, and will yield much of interest even to those who have already spent some years researching one aspect or another of the south-western counties.

Paul W SOWAN 14/07/1999

Monuments of war: the evaluation, recording and management of twentieth-century military sites. John Schofield (edr). English Heritage: viii + 221pp. 1998. FREE (Product Code XH20098) from English Heritage Customer Services, P0 Box 9019, LONDON W1A 0JA (Telephone 0171-973-3434)

This is a printed version of a day seminar held in April 1977, linked with the EH Monuments Protection Programme (MPP.) Following

this free summary, a series of published books is envisaged. The former Royal Commission on Historical Monuments for England's 'Monuments of the Cold War programme is the subject of one contribution (RCHME has since April 1999 been merged with English Heritage.)

The several short contributions are as follows

Twentieth-century fortifications in England: the MMP approach

Aerial photography in MMP site evaluations

The Defence of Britain Project

Our twentieth-century military heritage

RCHME recording programmes: monuments of the Cold War

Orford Ness

Thematic reviews: military aviation sites and structures

The Ministry of Defence Estate

The hot interpretation of the Cold War

Nevada Test Site

As seems all too characteristic of EH and the MMP, one could read this document and be left with the impression that we created no underground monuments for military purposes during the present century!

Paul W SOWAN: 11/06/1999

The Neolithic flint mines of England. Martyn BARBER, David FIELD, and Peter TOPPING. English Heritage / Royal Commission on the Historical Monuments of England: xiv + 95pp pbk. ISBN: 1-873592-41-8 1999. £25 + £3 p/lp from Oxbow Books, Park End Place, OXFORD, OX1 1HN (01 865)-24129 Fax : (01865)-79444. Email oxbow@oxbowbooks.com. Internet: www.oxbowbooks.com.

This is the first comprehensive national appraisal of reported (demonstrated by excavation, or claimed) flint-mine sites throughout England. It reports the result of field survey, aerial photography, and the examination of a widely scattered and often obscure published literature, as well as unpublished archaeological findings. Of 64 sites, 50 were visited.

The body of the text reviews previous research; the use, nature, and location of raw material; obtaining raw material; and the role of flint mines in Neolithic society. There are excellent photographic illustrations, both underground and at the surface; illustrations of worked flint; site surface and mine gallery plans and sections; and aerial photographs.

It is emphasised that neither the presence of struck flakes, nor of antlers, is in itself conclusive evidence for mining. Gunflint mines are considered to be sufficiently distinct from flint mines, and relatively well documented, for there to be no confusion. On the other hand, a number of underground workings have been re-interpreted as later chalk mines rather than ancient flint mines.

There are interesting discussions of two problematic issues - the restricted distribution of flint mining in three areas (Wessex, the South Downs, and Breckland) within a much wider distribution of chalk containing flint of apparently the same quality; and the absence of evidence (other than at a Scottish site outside the scope of this volume) for systematic working for flint from gravels, boulder clays, or clay-with-flint deposits. A further discussion looks at flint mines in relation to topography and landscape: there is some evidence that in some cases sites with the right local topography were preferred for mining purposes to others nearby where better flint might have been obtained.

A site gazetteer reports 10 sites accepted as undoubted flint mines, 10 additional possible flint-mining sites for which insufficient evidence in favour of or against mining has been reported, and 44 sites for which claims of Neolithic flint-mining is almost certainly

incorrect.' It is stressed, however, that excavation at sites in the second or third categories is necessary to settle the question of mining and or dating definitively.

Accepted flint mines

Blackpatch, West Sussex

Church Hill, West Sussex

Cissbury, West Sussex

Possible flint mines

Brading Down, Isle of Wight

Buckenham Toft, Norfolk

High Wycombe, Buckinghamshire

Rejected as flint mines

Ashtead, Surrey

Bacton, Norfolk

Badgerdell Wood, Herts

Tunnellers: the story of the Tunnelling Companies, Royal Engineers, during the World W. Grant GRIEVE and Bernard NEWMAN. Heathfield: The Naval & Military Press: 334pp. {Undated facsimile reprint of a work first published in 1936} £25.00 The Naval & Military Press, PO Box 61, Dallington, HEATHFIELD, Sussex, TN21 9ZS (01144)-01435-830111 FAX 01144)-01435-830623

E-mail order.dept@naval-military-press.co.uk <http://www.naval-military-press.co.uk> OR from the Royal Engineers Museum, Chatham

This is a facsimile reprint of the classic work, first published in 1936, on military offensive and defensive tunnelling and mining at Gallipoli (Turkey) and on the Western Front in Belgium and France during World War I. It is essentially the work of Captain W. Grant Grieve, assisted by Bernard Newman. The evolution of the use of tunnelling and placing explosive charges under enemy lines, and the part played by Lieut. Col. Sir John Norton Griffiths is described, followed by much detail of tunnelling conditions and operations on the western front, both British and German. Maps showing trench lines, tunnels, counter-mine tunnels, and crater resulting from mine explosions are included, as are some photographs of personnel, mine craters, etc. Specific chapters deal with Gallipoli, the Somme, Arras, Givenchy, Nieuport, Messines, and Passchendaele, etc. There is a general index (8 pages) and an index of Army units (2 pages.)

Essential reading for a little-understood aspect of World War I.

Paul W SOWAN 03/10/1999

Subterranean tourist routes in Poland Józef TWOREK (edr). Warszawa / Chehn: Urząd Kultury Fizycznej i Turystyki: 32pp. ISBN: 83-900751-7-2 paperback. 1997. Availability: Publishing and Advertising Agency "Dino", ul. Marszałkowska 77/79, 00-683 Warszawa, Poland. Telephone / FAX: (0*22) 622-32-42

This well-produced English-language guide in A4 format describes 28 underground sites to which the public are admitted, almost exclusively in the southern part of Poland. German and Polish versions of the booklet are also available.

Nine sites are natural caves. There are 11 sites which are mines or mine-related, including Neolithic flint mines at Krzemionki, salts mines at Bochnia and Wieliczka, tunnels (in part chalk mines) at Chehn, lead and silver mines at Tarnowskie-Góry (two sites), a gold mine at Złoty-Stok, and coal mines and associated sites at Zabrze (two sites), Walbrzych and Nowa Ruda.

Also described are historic cellars under Sandomierz, Jarosław, and Opatów; and four military sites including unfinished German underground factories of World War II near Walim.

The booklet has an attractive colour-printed cover, coloured illustrations and detailed map extracts to assist with location of sites, and an overall map of Poland with the sites marked. Each entry

describes what is to be seen, gives owner and contact details, opening-hours, and details of legal protection applicable to the site.

Curiously, although I visited some half dozen of the sites presented, I found this exceptionally helpful booklet on sale only at that at Cheim. Personnel at other sites, even though their sites featured in the booklet, had not been aware of it!

For any interested persons contemplating a visit to Poland this booklet is recommended as a most useful guide, even though there are in fact other publicly accessible underground sites which are not featured. Advance contact with the publishers in Warszawa might be the best way to ensure a copy.

Paul W SOWAN 08/10/19

The history of Halkyn mountain: the mountain with lead in its veins.

Bryn ELLIS. Holywell: Helygain: 239pp. 1998. ISBN 0-95340 1 1-0-3. £ 7.95 from Embsay Steam Railway Trading Co. Ltd., Embsay Station, SKIPTON, North Yorkshire BD23 6AX

The book presents Halkyn mountain, on the north Wales coast in Flintshire, in all its aspects. Although written as a general local history, the area is of course especially noteworthy for the several mineral industries carried on on the surface of the mountain, or by mining inside it. These have included quarrying for chert and limestone, and (in a small way) sand and clay; and mining for lead. Some limestone was also mined underground for the glass industry c. 1939-69. Railway developments associated with these are described in some detail.

There is generous provision of maps, mine plans and sections, reproductions of old documents, and graphs portraying statistical data. Photographs, including several aerial photographs, are disappointingly far from sharp.

This is a thorough volume, with 13 pages of bibliographical notes but, regrettably, no index.

Paul W SOWAN 08/06/1999

A guide to the industrial archaeology of Kent.

David EVE. Association for Industrial Archaeology: 61pp. 1999. ISBN: 0-9528930-2-9. Association for Industrial Archaeology, do School of Archaeological Studies, University of Leicester, LEICESTER, LE1 7RH

This guide is issued in connection with the forthcoming AIA Annual Conference to be held at Chatham in September, 1999. It is compiled along similar lines to previous guides in the series, with entries roughly grouped under the following headings: Agricultural and fisheries processing; Brewing, malting, and hops; Ironworking and engineering; Lime and cement making; Brickmaking and other extractive industries; Paper making; The explosives industry; Utility industries; Maritime transport; Land and air transport; Miscellaneous industries and workers' housing. Kent's abundant military and defence structures, well described in other current publications, are not included.

A seven page introduction, despite some idiosyncratic spellings, gives an excellent overview of the county's geology and geography and industrial development, and acknowledges the importance of the military and naval presence.

The sites and structures selected have, in the main, been restricted to those now visible, with an acceptable balance between industrial sectors. Perhaps oddly, only two tunnels (the fallen-in Tyler tunnel on the Canterbury & Whitstable Railway, and the Higham to Strood tunnels converted from canal to railway use) are mentioned. It seems perverse not to have mentioned the unusual Abbotscliffe and Shakespeare Cliff tunnels, or indeed the still-visitable early but unfinished Channel Tunnel! Apart from the east Kent coal mines, the only underground mineral workings noted are two chalkwells. The excellent work of the Kent Underground Research Group is referred to only in connection with this site at Lynsted. The presence

in the county of underground building-stone quarries, fullers earth mines, sand mines, large numbers of deneholes, and very substantial 19th - 20th century chalk mines is not mentioned. Disappointingly, none of the splendid KURG publications feature in the list for further reading.

A location map showing the approximate positions of sites within the county is included, as is a page and a half of suggestions for further reading, and an index.

Paul W SOWAN 20/08/1999

The Second World War. A guide to documents in the Public Record Office. 2nd edn. John D. CANTWELL. Public Record Office Handbooks 15: (iii) +233pp ISBN 0-1 1-440254-X pbk 1993 £10.95

Gives the history and describes the work of Government departments during the war, and lists the main classes and headings of records open to inspection.

Industrial and transport records are included, for example under

Ministry of Aircraft Production

Ministry of Fuel and Power

Department of Scientific and Industrial Research

Ministry of Shipping

Ministry of Transport

Ministry of War Transport

Works Departments etc

Paul W SOWAN 26/11/1999

Pillar stability and large-scale collapse of abandoned room and pillar limestonemines in SouthLimburg, the Netherlands.

Roland Frits BEKENDAM. Maastricht: Bekendam Geotechniek: xi + 361 pp. ISBN: 90-9011726-1 paperback. 1998. Hlf.(Guilders) 40 from Bekendam Geotechniek, Meidorn 93, NL-6226 WG MAASTRICHT, The Netherlands. [Postage/package extra.]

This is a printed and published higher degree thesis presented at the Technical University at Delft, and considers a sample of the almost 200 underground limestone quarries (several of them extremely extensive) in the neighbourhood of Valkenburg and Maastricht (in the Netherlands) and in immediately adjoining areas in Belgium. Although largely a specialised geotechnical work, with considerable quantities of mathematical calculations relating to rock mechanics, the book is also of considerable general interest for all concerned with underground building-stone quarrying in any way, including industrial archaeology and history, and tourism.

General descriptions of the geology of the Maastrichtian chalk, and of the quarrying methods, are followed by sections on mining history in the area (flint mining at Ryckholt-St.Geertruid and underground quarrying), and subsequent uses of some of the quarries for sheltering in times of war, mushroom farming, German factories in World War II, and (today in several sites) tourism.

The bulk of the text concerns pillar dimensions, loading factors, crushing strengths, and modes of large-scale collapse (collapse of large areas simultaneously is the focus, not the isolated collapse of individual pillars.) Most interesting are detailed case-studies of historically recorded major collapses, especially at the Dutch quarries Fallenberg (1705 and 1920), St. Pietersberg (1794 and 1809), Gemeentegrot (at Valkenburg)(1845 and 1886), and Heidegroeve (1988.) And at the Belgian quarries Muizenberg (1926) and Roosburg (1958.) More than one collapse mechanism is distinguished. The Heidegroeve collapse is especially well documented, and it is concluded that in this case the event was not related to World War II pillar-robbing, nor to long-term pillar deterioration, nor to earthquake activity (there was a strong earthquake in the southern Netherlands in recent years, which has been observed to have had minimal effects

on the stability of the underground quarries), but to the supposed presence of a lower level of galleries below the quarry, which had been worked from a neighbouring quarry but rendered inaccessible by an earlier collapse event. Apart from the effects of sudden collapses of large areas on persons working underground, and surface subsidence and damage to property, the associated air blast is identified as a perhaps unexpected additional hazard. When four hectares of the Roosburg quarry collapsed on 23rd December 1958 a number of persons picking mushrooms were killed outright by the falling rock, but others were killed or injured as a result of being hurled through the mine (along with loose rocks) by the air blast. In total, 18 died in this incident, and another three were severely injured.

It is concluded that, with proper periodic examination of pillar condition, and calculations of pillar loading, areas of the underground quarries can be classified in various degrees of stability and likelihood of collapse. This is of particular interest as the quarries contain an astonishingly rich heritage of archaeologically, historically and culturally important toolmarks, graffiti, and the like, dating back to the 13th century.

Paul W SOWAN 04/10/1999

V3 pump gun. Peter THOMPSON. ISO Publications, 38pp [Unpaginated] A4 paperback. 01171-261-9588/9179 FAX 1877. 1999 £7.95 + p/p from ISO Publications, 137 Westminster Bridge Road, LONDON SE1 7HR

This curious publication announces itself as 'A short summary based on the original Sanders Report of the preliminary examination of the construction site at the end of hostilities amended and extended by the author. This monograph covers the actual construction with only an outline of the gun characteristics and is to be followed by a technical appraisal and evaluation of the gun itself.'

Acknowledgement is made to 'the MKD Technical Department', Franz Knoke, Peter Tanner, and John Hanley.

What follows is a very detailed description of the underground works at Mimoyecques, with measured plans and sections, and photographs. These reveal a great deal more than can be seen by visiting the site now, including the '100 metre level' (still visitable), the '62 metre level', and the '47 metre level' which had to be pumped out before inspection was possible. 'The lowest level reached was the '30 metre level', where it is assumed the breech chambers were to be located ... At this low level the workings had suffered severely from falls, and all efforts failed to pump them dry. Their existence was confirmed but a thorough investigation was impossible.' There are plans and sections of the structure 'as found in November 1944' supplemented by a 'reconstruction' drawing to give an overall impression of the possible layout underground. Photographs underground, and drawings, show details of large quantities of steel work evidently designed for the projectile-launching shafts. Presumably this steelwork was removed by the Allied forces before their demolition work and sealing. Further photographs show the experimental pump-guns (on the surface) at Hillersleben and Misdroy.

Evidence is noted for a start having been made on a second similar structure 'about a mile away', although this duplicate 'pump gun' was abandoned 'at a very early stage.'

The document concludes with accounts of machinery for bomb proof doors, the air conditioning plant, and a discussion of the technicalities of cordite or hydrogen peroxide propulsion.

The site was abandoned in July 1944, quantities of materials having been evacuated back to Germany from the previous month. Very little German documentation was found. Nothing is said about the rumoured existence of a large part of the workforce entombed in the lowest level.

Paul W SOWAN 26/11/1999

Skelton Park Pit ironstone mine [cover title]/Skelton Park ironstone mine: a history of mining near Skelton [title page] Simon CHAPMAN. Industrial Archaeology of Cleveland/Cleveland Ironstone Series: 64pp. 1999. £5.95 from Peter Tuffs, Printer and Publisher, 48 Mackie Drive, GUISBOROUGH, Cleveland TS14 6DJ

Peter Tuffs as a publisher and printer of material on the industrial archaeology and history, and especially on the ironstone mining, of Cleveland, is doing excellent work in making information about these important topics more widely available. Nevertheless, one wishes he might adopt more generally accepted publishing conventions, and might ensure that the quality of reproduction of his most interesting booklets is uniformly good!

Simon Chapman's booklet outlines the discovery of workable iron ores in Cleveland, and the progressive sinking of deeper and more extensive mines to exploit them. The Skelton Park mine 'was a child of the iron-making boom of the early 1870s' and was worked until its closure in 1938.

The author's detailed recording of the surviving buildings was a highly commended runner-up in the Association of Industrial Archaeology's annual Fieldwork Award in 1988, and has been lodged in the National Monuments Record. The site has been recognised as of national importance in connection with the understanding of the UK's iron industry, and structures listed.

The surviving surface structures are described in the booklet, which is illustrated with almost a dozen photographs and reproductions of old prints, and several reproductions of surface maps and mine plans. Extensive notations are included from printed sources.

Paul W Sowan 18/07/1999

The Kemp Town branch line. Peter A. HARDING Woking: author: 32pp. 1999. ISBN: 0-9523458-4-6 £ 3.00 from Embsay Steam Railway Trading Co. Ltd., Embsay Station, SKIPTON, North Yorkshire BD23 6AX

Describes the former short branch line from the main line terminus at Brighton to Kemp Town. Much of the two-mile branch was on viaducts or embankments, or in the 1024-yard Kemp Town tunnel, and the first part of the branch service operated over the rails of the Brighton-Lewes line. The branch opened in 1869, passenger services ceased in 1933, whilst good services continued until 1971. Very little trace of this line now remains, all station buildings and most built infrastructure having been demolished. The cutting at the northern end of the tunnel has been filled and the north portal buried. The sealed southern portal is now within a light industrial estate on the site of the former Kemp Town terminus.

There is a sketch map of the line, indicating the positions of the two intermediate stations at Lewes Road and Hartington Road. Track layout diagrams are provided for the junction with the Brighton-Lewes line, and Kemp Town station. Over 40 illustrations show the line in operation and in disuse, stations, rolling stock, viaducts, tunnel portals etc. Timetables for 1890 and 1922 are presented, and illustrations of tickets.

Paul W SOWAN 08/06/1999

Editors Note. *The Guardian*, Monday December 6 1999 showed a photograph of the southern portal of the tunnel with the caption: To rent; one mile-long tunnel. Situated on the edge of the South Downs, the tunnel was built in 1869 and provided a connection to Lewes and Brighton's main railway stations for the people of Kemp Town. During the 20s it carried 80,000 passengers a year. It was closed in 1933 and was an air raid shelter during the war, but was later used by freight trains until 1971. It has since housed a mushroom farm and is now used by a firm of Brighton solicitors as an archive.